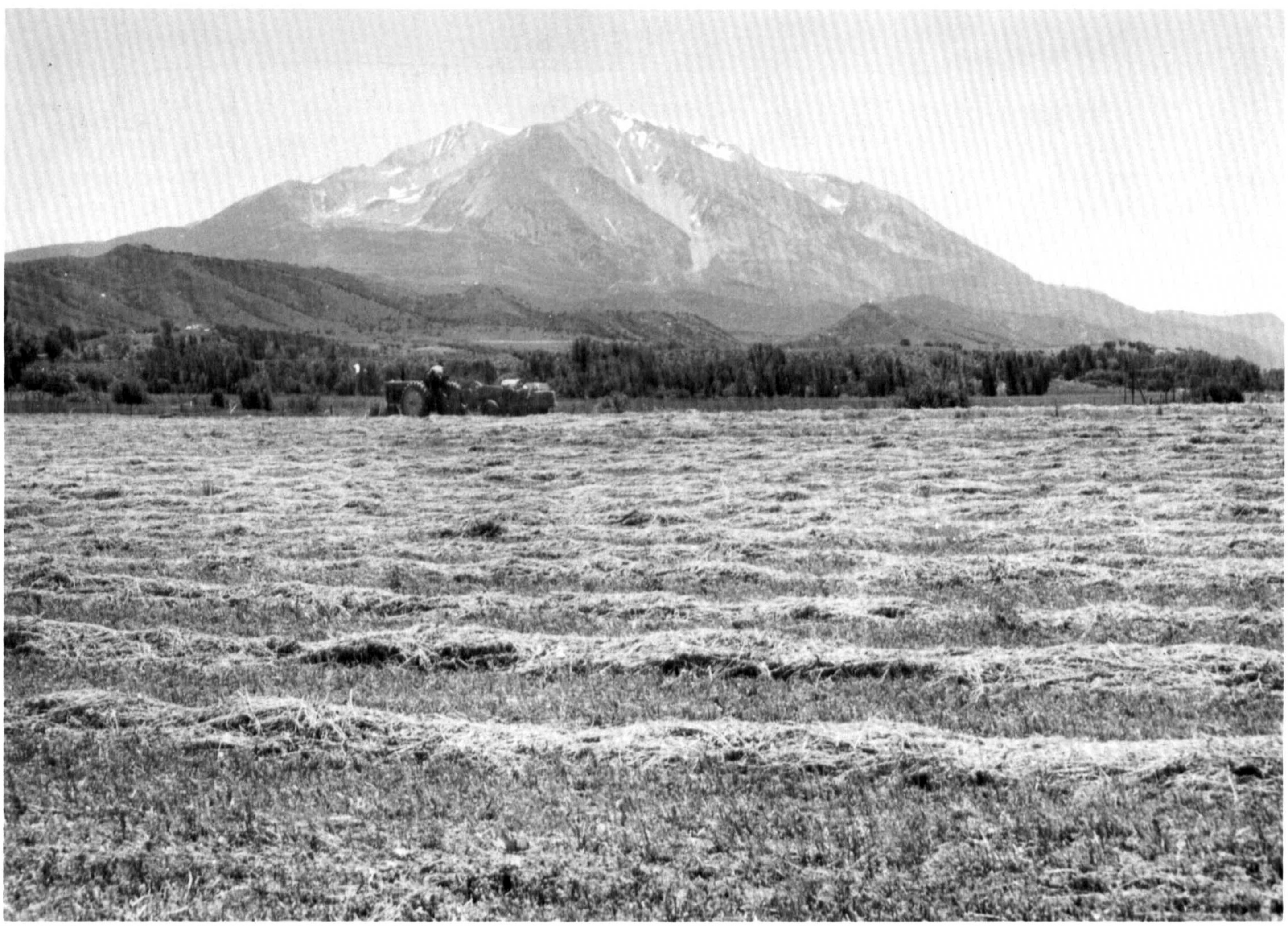
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
United States Department
of the Interior, Bureau of
Land Management, and
the Colorado Agricultural
Experiment Station

Soil Survey of Aspen-Gypsum Area, Colorado,

Parts of Eagle, Garfield, and Pitkin Counties



How To Use This Soil Survey

General Soil Map

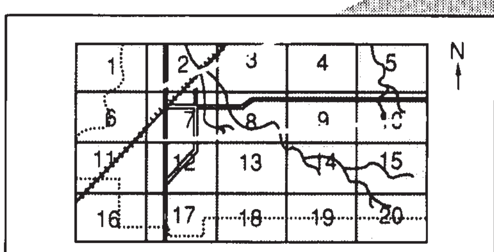
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



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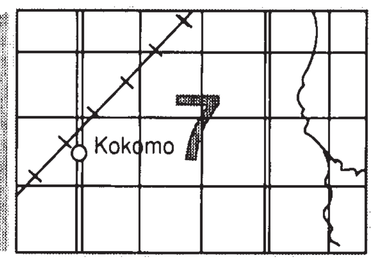
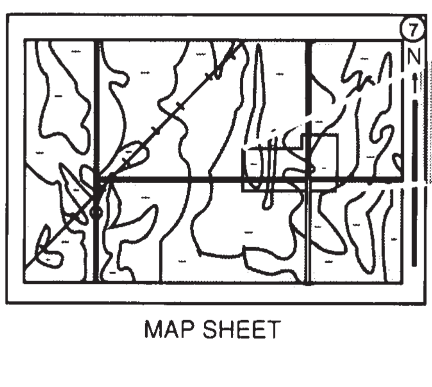


MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



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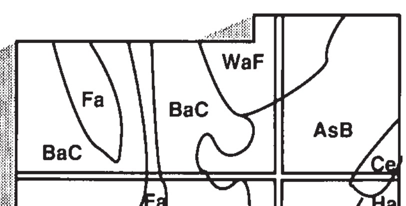

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1981. Soil names and descriptions were approved in 1984. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. This survey was made cooperatively by the Soil Conservation Service; the United States Department of the Interior, Bureau of Land Management; and the Colorado Agricultural Experiment Station. It is part of the technical assistance furnished to the Mount Sopris and Eagle County Soil Conservation Districts. Assistance was also provided by Eagle and Pitkin Counties.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: An irrigated area of Atencio-Azeltine complex, 3 to 6 percent slopes.

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Foreword

This soil survey contains information that can be used in land-planning programs in the survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

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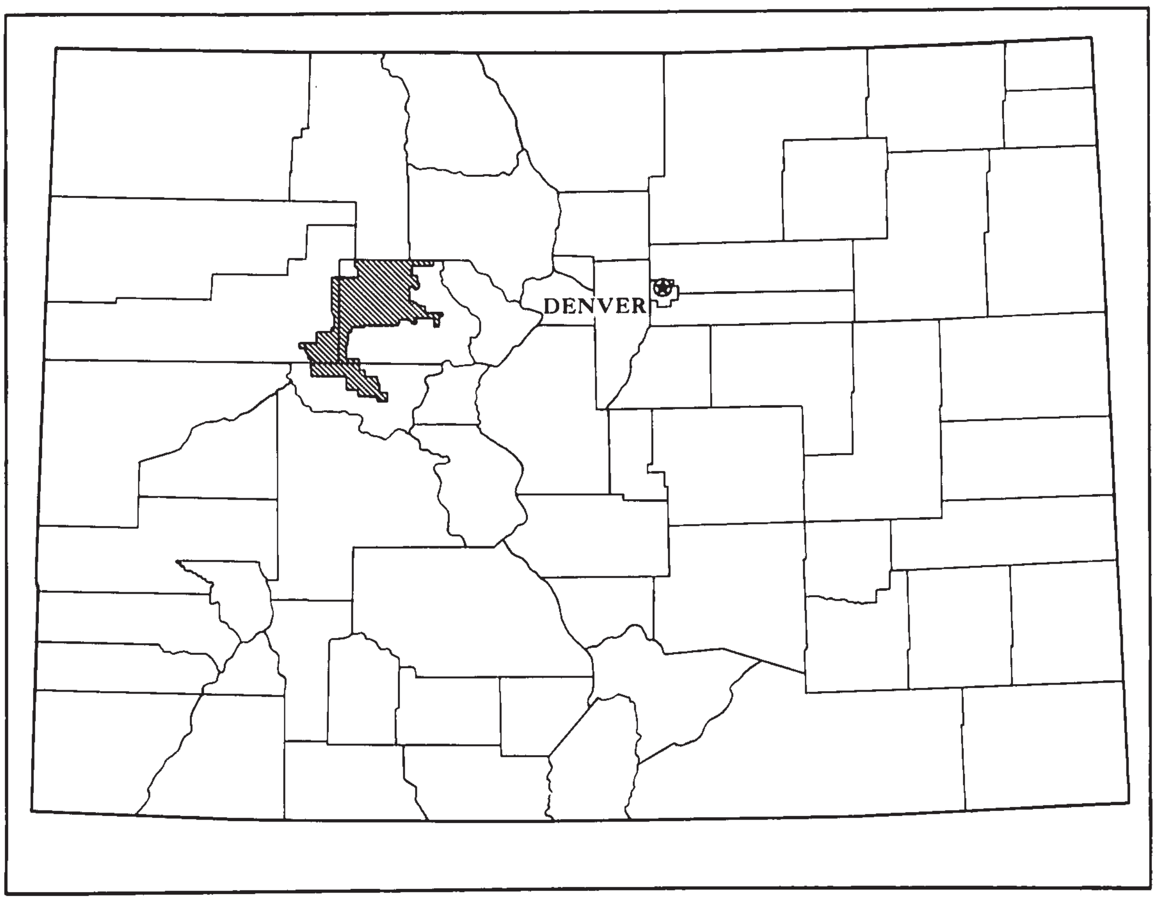

Location of the Aspen-Gypsum area in Colorado.

Soil Survey of
Aspen-Gypsum Area, Colorado,
Parts of Eagle, Garfield, and Pitkin Counties

By David K. Alstatt and Don Moreland, Soil Conservation Service

Fieldwork by Don Moreland, Jerry Harman, Tom Bargsten, Paul Ray, and Steve McWilliams, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with
United States Department of the Interior, Bureau of Land Management, and Colorado Agricultural Experiment Station

The survey area consists of a small part of Garfield County, nearly all of Eagle County, and all of Pitkin County. These counties are in central Colorado and are west of the Continental Divide. Areas of national forest have been excluded. The survey area includes 643,200 acres of privately owned land and land controlled by the Bureau of Land Management. Privately owned land inside the national forest boundaries is not included.

Aspen, the county seat of Pitkin County, is at an elevation of 7,907 feet, and Eagle, the county seat of Eagle County, is at an elevation of 6,600 feet. The most important town in the Garfield County portion of the survey area is Carbondale, at an elevation of 6,170 feet.

The survey area consists of steep mountain uplands and moderately steep valleys and nearly level alluvial areas along the major streams and rivers. The Colorado, Eagle, and Roaring Fork Rivers are the major drainageways. The Colorado River flows west into Utah.

General Nature of the Survey Area

This section gives general information about Eagle, Garfield, and Pitkin Counties. It describes history and development; agriculture; physiography, relief, and drainage; geology; and climate.

History and Development

Colorado became part of the United States in 1819 as a result of separate treaties with Spain and the Ute Indians. The area became better defined as a result of John C. Fremont's explorations in 1844 and 1845 and became a territory in 1861. In 1876, Colorado became a state. It is known as the Centennial State.

Eagle County was originally part of Summit County and was officially formed in 1883. The original county seat was Redcliff. Eagle became the county seat in 1921.

Agriculture in Eagle County started in 1887, and the narrow-gauge railroad was constructed in the same year. Presently, livestock enterprises, tourism, and recreation are the most important industries in the area. Vail, which is in Eagle County, is an important ski resort.

Pitkin County was originally part of Gunnison County, but it became a separate county in 1881. Aspen, the county seat, was established in 1880 because of the silver, zinc, and gold mining in the area. The area reverted to ranching during the silver panic of 1893. The first ski run was set up in 1936. Presently, Pitkin County has some ranches, but it is best known for its recreation facilities.

Carbondale, in Garfield County, was incorporated in 1889. It was originally settled primarily as an agricultural area, but mining was also very important to the economy. Today, both mining and agriculture are important industries in this part of Garfield County.

Agriculture, mining, construction, and recreation are the chief sources of revenue for the survey area. Livestock and some small grain form the base for the agricultural sector. Mining and construction have

Figure 1.—Irrigated pasture and alfalfa hay in the Roaring Fork Valley. Torriorthents-Rock outcrop complex, 45 to 95 percent slopes, and Gypsum land-Gypsiorthids complex, 12 to 65 percent slopes, are on the steep slopes in the background. The soils in the valley are Fluvaquents, Redrob, Atencio, and Azeltine. The soils on fans and toe slopes are mainly Yamo soils.

become important industries as a result of the development of vast stores of natural resources in and near the area. Mining provides a substantial number of jobs and income for the area's towns. The construction industry, another large employer, produces raw materials in the form of sawtimber, building stone, and concrete aggregate. In addition to the winter sports opportunities for which Vail and Aspen are famous, the survey area has become a popular summer recreation area.

Native vegetation in the area includes spruce, fir, lodgepole pine, aspen, and ponderosa pine in the higher forested parts and pinyon, juniper, oak brush, sagebrush, and grasses at the somewhat lower elevations. The valleys are mainly irrigated pastures or are used to grow legumes and some small grains.

Agriculture

Livestock production is the principal agricultural enterprise in the survey area. Most of the commercial cattle units are cow-calf operations and must feed their stockers through the winter. The feeding season extends from November through April. Sheep ranching is the primary use for approximately one-fifth of the rangeland in Eagle County. Most of the sheep winter in Utah.

Because of the livestock industry, irrigated land is used primarily for pasture and hay (fig. 1). The Eagle and Mount Sopris Soil Conservation Districts assist ranchers in determining the management needs of their units. Such practices as improved irrigation water management, proper grazing use, and timely grazing

are essential to maintaining good production. Brush management, reseeding, and proper fertilization also are necessary.

The soils in the survey area are limited for most uses by the climate and the hazard of erosion. In the area around the town of Gypsum, for example, many of the soils contain relatively large amounts of the mineral gypsum. Because these soils are extremely unstable when water is applied, erosion is a severe hazard. Although the soils can produce good truck crops, a short growing season and a shortage of labor make farming more difficult than in other areas. The extent of agriculture is declining as land in the survey area is being converted to sites for homes and for recreation.

Physiography, Relief, and Drainage

The survey area is located in the west-central part of Colorado. It lies within the Southern Rocky Mountain physiographic province and features a wide diversity of topography, geologic materials, vegetation, climate, and soils.

In general, the area is characterized by steep mountain slopes, hills, and ridges; rolling mesas; canyons; and the gently sloping valleys of the Eagle, Roaring Fork, Crystal, and Colorado Rivers. The mesas or benches are generally gently sloping to strongly sloping, but the sides are commonly steep or very steep. The mountains, ridges, and hills are generally steep or very steep and include canyon walls, escarpments, and some narrow valleys. The valleys along the major streams are mainly nearly level or gently sloping, but in places terrace faces are steep or very steep.

The Eagle, Crystal, and Roaring Fork Rivers are tributaries of the Colorado River. They flow through the area from east to west. In addition to providing water and recreational opportunities for the survey area, they furnish the means for the generation of hydroelectric power and are increasingly important in the development of energy resources.

The elevation of the survey area ranges from about 5,900 feet near Glenwood Springs to over 11,000 feet on Castle Peak north of Eagle. Most of the major valleys range in elevation from 5,900 feet to about 7,500 feet, but the Roaring Fork Valley at Aspen has an elevation of slightly more than 8,000 feet.

Geology

The survey area is principally a part of the White River geological uplift, which includes exposures ranging in age from Precambrian to Quaternary. The area features many faults that generally trend slightly north and west, at an approximate right angle to the trend of such faults elsewhere in the state. Basalt flows cover much of the area south and west of the Colorado River. Glacial deposits are widely distributed throughout the area, and alluvium and stream-laid gravel and boulders form a broad belt along the Colorado, Roaring Fork, and Eagle Rivers. Several thick beds of coal in the Mesa Verde Group crop out in the southwestern part of the area. Several formations contain deposits that are potentially valuable as reserves for oil, gas, and coal. Hot springs issue from the Dakota and Leadville Formations, especially near Glenwood Springs. Eolian deposits mantle portions of the survey area south of Glenwood Springs.

Climate

Summers are warm or hot in most of the valleys in the survey area and much cooler in the mountains. Winters are cold in the mountains. Valleys are colder than the lower slopes of the adjacent mountains because of cold air drainage. Precipitation occurs in the mountains throughout the year, and a deep snowpack accumulates during winter. Snowmelt usually supplies much more water than can be used for agriculture in the area. In the valleys, summer precipitation falls as showers and some thunderstorms occur. In winter the ground is covered with snow much of the time. Chinook winds, which blow downslope and are warm and dry, often melt the snow.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Glenwood Springs, Eagle, and Aspen, Colorado, for varying periods between 1900 and 1988. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season. Eagle and Glenwood Springs represent the agriculturally important valleys, and Aspen represents the middle slopes, which are 1,500 to 2,000 feet above the valleys.

In the valleys, average temperatures are slightly higher than on the middle slopes and the extremes are greater. In winter, the average temperature is 26 degrees F and the average daily minimum temperature is 14 degrees. The lowest temperature on record, which occurred at Eagle on January 12, 1963, is -51 degrees. In summer, the average temperature is 67 degrees and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Glenwood Springs on June 23, 1954, is 102 degrees.

On the middle slopes, winter is characterized by an average temperature of 22 degrees F and an average daily minimum temperature of 9 degrees. The lowest temperature on record, which occurred at Aspen on

January 12, 1963, is -33 degrees. In summer, the average temperature is 60 degrees and the average daily maximum temperature is 77 degrees. The highest recorded temperature, which occurred at Aspen on June 23, 1954, is 93 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." Beginning in spring, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 50 percent usually falls in April through September. In 2 years out of 10, rainfall in April through September is less than 5 inches in the valleys and less than 7 inches on the middle slopes. The heaviest 1-day rainfall during the period of record was 3.2 inches at Glenwood Springs on June 24, 1969. Thunderstorms occur about 35 times each year.

On the middle slopes the average seasonal snowfall is 138 inches. The greatest snow depth at any one time during the period of record was 56 inches. On the average, 70 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

In the valleys the average seasonal snowfall is about 50 to 60 inches. The greatest snow depth at any one time during the period of record was 40 inches. On the average, 20 days have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is less than 33 percent in spring and about 44 percent during the rest of the year. Humidity is higher at night, and the average at dawn is about 59 percent. The sun shines about 77 percent of the time possible in summer and 61 percent in winter. The prevailing wind is from the east-southeast. Average windspeed is highest, 10 miles per hour, in June.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils

in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map units in this survey have been grouped into general kinds of landscape for broad interpretive purposes. Each of the broad groups and the map units in each group are described in this section.

Map Unit Descriptions

Soils on Alluvial Valley Floors, Flood Plains, Fans, and Terraces

These soils make up about 2 percent of the survey area.

1. Atencio-Redrob-Azeltine

Gently sloping and strongly sloping, somewhat poorly drained and well drained, deep soils; on alluvial valley floors, flood plains, fans, and terraces

This map unit is in the southwestern part of the survey area. Slope is 1 to 6 percent. The vegetation is mainly grasses. Shrubs, cottonwoods, and willows grow along the river bottoms. Elevation is 5,900 to 6,500 feet. The average annual precipitation is about 15 to 18 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free season is 85 to 120 days.

This unit makes up about 2 percent of the survey area. It is about 36 percent Atencio soils, 32 percent Redrob soils, 19 percent Azeltine soils, and 13 percent soils of minor extent.

Atencio soils are on alluvial fans and terraces. These soils are gently sloping and strongly sloping and are well drained. They formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is sandy loam. The subsoil is sandy loam and sandy clay loam. The next layer is gravelly sandy loam. Below this to a depth of 60 inches is sandy material in which the content of rock fragments is 25 to 60 percent.

Redrob soils are on alluvial valley floors, low terraces, and flood plains. These soils are gently sloping and strongly sloping and are somewhat poorly drained. They formed in mixed alluvium derived dominantly from sandstone and shale. Typically, the surface layer is loam. The subsoil is stratified stony and cobbly sandy loam and sandy clay loam. Below this to a depth of 60 inches is sandy material mixed with cobbles and stones.

Azeltine soils are on alluvial fans and terraces. These soils are gently sloping and strongly sloping and are well drained. They formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is gravelly sandy loam. The next layer is gravelly loam. Below this to a depth of 60 inches is extremely gravelly sand.

Of minor extent in this unit are Kilgore soils and Fluvaquents.

This unit is used mainly for livestock grazing, irrigated hay and pasture (fig. 2), wildlife habitat, or homesite and industrial development. It also is used as a source of gravel and crushed rock.

Wetland wildlife, especially waterfowl, use some areas of this unit for food and cover. Because of the availability of moisture in areas of the somewhat poorly drained Redrob soils, wetland plants can provide nesting areas and protective cover. Wildlife habitat can be preserved by avoiding overgrazing, particularly along streams, so that the plant cover used by wildlife is not destroyed.

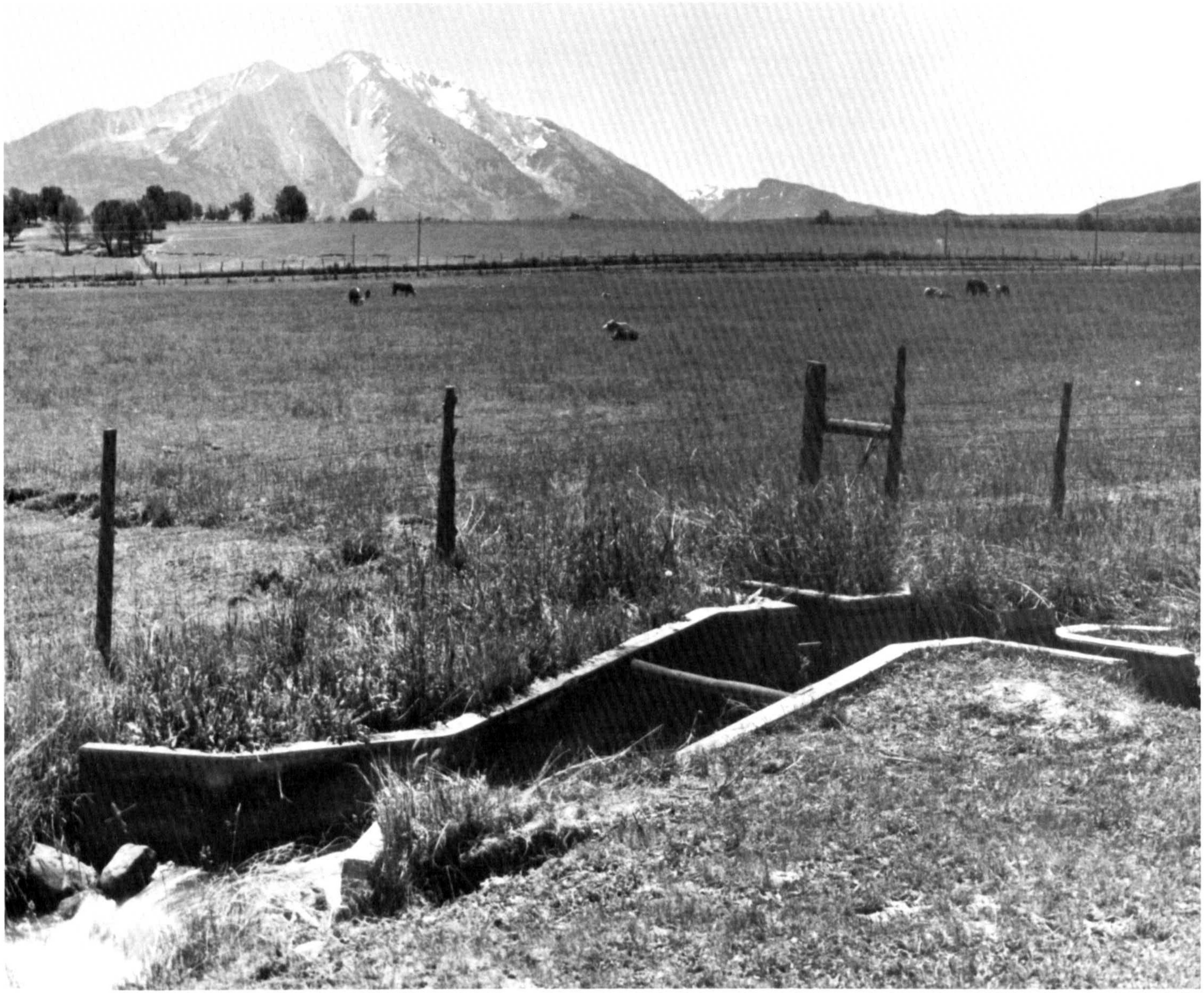

Figure 2.—A typical area of general soil map unit 1. Much of this unit is used for irrigated hay and pasture. Mount Sopris is in the background.

If this unit is used for irrigated hay and pasture, the main limitations are a low available water capacity and stoniness.

If this unit is used for homesite development, the main limitations are a hazard of flooding and a high water table in areas adjacent to streams.

Dominantly Cool Soils in the Mountains

These soils make up about 47 percent of the survey area.

2. Brownsto-Showalter-Tridell

Strongly sloping to very steep, well drained and somewhat excessively drained, deep soils; on fans, terraces, and mountainsides

This map unit is throughout the survey area. Slope is 5 to 50 percent. The vegetation is mainly woody shrubs, grasses, forbs, pinyon, and juniper. Elevation is 6,400 to 8,500 feet. The average annual precipitation is about 12 to 16 inches, the average annual air temperature is

40 to 44 degrees F, and the average frost-free season is 85 to 105 days.

This unit makes up about 6 percent of the survey area. It is about 31 percent Brownsto and similar soils, 27 percent Showalter and similar soils, 26 percent Tridell and similar soils, and 16 percent soils of minor extent.

Brownsto soils are on fans and terraces. These soils are strongly sloping to very steep and are well drained. They formed in alluvium derived dominantly from basalt and calcareous material. Typically, the surface layer is gravelly sandy loam. Below this is gravelly loam. The next layer is very gravelly sandy loam and very gravelly loamy sand. Below this to a depth of 60 inches is gravelly sandy loam.

Showalter soils are on convex parts of the landscape. These soils are strongly sloping to steep and are well drained. They formed in alluvium derived dominantly from basalt. Typically, the surface layer is very stony loam. The subsoil is very cobbly clay and clay loam to a depth of 60 inches or more.

Tridell soils are on terraces and mountainsides. These soils are moderately steep to very steep and are somewhat excessively drained. They formed in alluvium and colluvium derived dominantly from basalt. Typically, the surface layer is gravelly loam. The next layers are very cobbly fine sandy loam and cobbly sandy loam. Below this to a depth of 60 inches is very stony fine sandy loam and very stony loamy sand.

Of minor extent in this unit are Morval and Forelle soils.

This unit is used mainly for rangeland, hayland, crops, or wildlife habitat. It also is used for urban and homesite development, for Christmas trees, or as a source of firewood and posts.

This unit is highly valued as critical winter range for mule deer. It provides habitat for other wildlife, including cottontail, green-tailed towhee, various birds of prey, sage grouse, and a few elk late in winter.

If this unit is used for homesite or urban development, the main limitations are the slope and stones.

3. Earsman-Cushool-Rentsac

Moderately steep to very steep, well drained and somewhat excessively drained, shallow and moderately deep soils; on mountainsides, ridges, hills, and mesa side slopes

This map unit is in the northern, central, and southern parts of the survey area. Slope is 12 to 65 percent. The vegetation is mainly grasses, forbs, woody shrubs, pinyon, juniper, and small conifers. Elevation is 6,000 to 8,500 feet. The average annual precipitation is about 10 to 16 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free season is 80 to 105 days.

This unit makes up about 19 percent of the survey area. It is about 41 percent Earsman and similar soils, 25 percent Cushool and similar soils, 20 percent Rentsac and similar soils, and 14 percent soils of minor extent.

Earsman soils are on mountainsides and ridges. These soils are moderately steep to very steep and are shallow and somewhat excessively drained. They formed in residuum and colluvium derived dominantly from calcareous redbed sandstone. Typically, the surface layer is very stony sandy loam. Below this is very channery sandy loam. Hard, calcareous sandstone is at a depth of 19 inches.

Cushool soils are on upland hills, ridges, and side slopes. These soils are moderately steep to very steep and are moderately deep and well drained. They formed in residuum and alluvium derived dominantly from shale and sandstone. Typically, the surface layer is loam. The upper part of the subsoil is loam and channery loam. The lower part to a depth of 35 inches is extremely channery sandy loam. Soft, calcareous sandstone is at a depth of 35 inches.

Rentsac soils are on mountainsides and mesa side slopes. These soils are steep and very steep. They are shallow and well drained. They formed in residuum and colluvium derived dominantly from sandstone. Typically, the surface layer is channery loam. Below this is extremely channery loam. Hard sandstone is at a depth of 18 inches.

Of minor extent in this unit are Almy and Miracle soils.

This unit is used mainly as rangeland or as wildlife habitat. It also is used for Christmas trees or as a source of firewood and posts.

This unit is very important as winter range for elk and mule deer. Irrigated hayland interspersed with pinyon and juniper on ridges makes this area ideal habitat for these animals. Pinyon jay, cottontail, and hairy woodpecker also inhabit areas of this unit.

4. Empedrado-Morval-Evanston

Gently sloping to very steep, well drained, deep soils; on hills, fans, and valley sides

This map unit is in the southern and eastern parts of the survey area. Slope is 1 to 65 percent. The vegetation is mainly grasses and woody shrubs. Elevation is 6,500 to 9,000 feet. The average annual precipitation is about 13 to 18 inches, the average

annual air temperature is 40 to 46 degrees F, and the average frost-free season is 75 to 95 days.

This unit makes up about 7 percent of the survey area. It is about 45 percent Empedrado soils, 22 percent Morval soils, 20 percent Evanston soils, and 13 percent soils of minor extent.

Empedrado soils are on hills and fans. These soils are gently sloping to steep. They formed in alluvium and eolian material derived dominantly from mixed material. Typically, the surface layer is loam. Below this to a depth of 60 inches is clay loam.

Morval soils are on alluvial fans. These soils are gently sloping to steep. They formed in alluvium derived dominantly from basalt. Typically, the surface layer is loam. The subsoil is clay loam. Below this to a depth of 60 inches is loam.

Evanston soils are on alluvial fans and valley sides. These soils are gently sloping to very steep. They formed in mixed alluvium. Typically, the surface layer is loam. The subsoil is clay loam. Below this to a depth of 60 inches is loam.

Of minor extent in this unit are Tridell, Forelle, Brownsto, and Fughes soils.

This unit is used mainly for rangeland, pasture, hayland, crops, or wildlife habitat or as a source of firewood. It also is used for homesite development.

This unit provides important winter range and migration routes for mule deer and elk. At the higher elevations, only the west- and south-facing side slopes provide important winter range. Cottontail, various birds of prey, pinyon jay, and hairy woodpecker also are common on this unit.

If this unit is used for homesite development, the main limitations are the shrink-swell potential and the slope.

5. Forelle-Yamo-Almy

Gently sloping to steep, well drained, deep soils; on fans, benches, toe slopes, and mountains

This map unit is in the central and northern parts of the survey area. Slope is 1 to 25 percent. The vegetation is mainly woody shrubs, grasses, forbs, and scattered small conifers. Elevation is 6,000 to 7,800 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free season is 85 to 105 days.

This unit makes up about 4 percent of the survey area. It is about 32 percent Forelle and similar soils, 27 percent Yamo and similar soils, 25 percent Almy and similar soils, and 16 percent soils of minor extent.

Forelle soils are on mountains and benches. These soils are strongly sloping to steep. They formed in alluvium derived dominantly from sedimentary rock. Typically, the surface layer is loam. The subsoil is clay loam. Below this to a depth of 60 inches is loam and clay loam.

Yamo soils are on fans and toe slopes. These soils are gently sloping to steep. They formed in colluvium. Typically, the soils are loam to a depth of 60 inches.

Almy soils are on fans and uplands. These soils are gently sloping to steep. They formed in alluvium derived dominantly from calcareous redbed sandstone and shale. Typically, the surface layer is loam. The subsoil is fine sandy loam over sandy clay loam. Below this to a depth of 60 inches is fine sandy loam.

Of minor extent in this unit are Brownsto, Dotsero, Mussel, and Goslin soils.

This unit is used for rangeland, hay, pasture, or homesite development.

This area is very important winter range for mule deer and elk. The development of subdivisions has severely reduced the area of winter range. This unit also provides habitat for mallards, mourning dove, pinyon jay, prairie dogs, and coyote.

If this unit is used for homesite development, the main limitation is the slope.

6. Gypsum Land-Gypsiorthids

Gypsum land and moderately steep to very steep, well drained, shallow and moderately deep soils; on eroded hills, mountainsides, and breaks

This map unit is in the central part of the survey area. Slope is 12 to 65 percent. The vegetation is mainly forbs, grasses, woody shrubs, pinyon, and juniper. Elevation is 6,400 to 7,400 feet. The average annual precipitation is about 13 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free season is 90 to 105 days.

This unit makes up about 7 percent of the survey area. It is about 65 percent Gypsum land, 20 percent Gypsiorthids, and 15 percent soils of minor extent.

The Gypsum land consists mainly of exposed parent material that has a very high content of gypsum. It is moderately steep to very steep.

Gypsiorthids are on eroded hills, mountainsides, and breaks. These soils are moderately steep to very steep and are shallow and moderately deep. They formed in residuum and colluvium derived dominantly from gypsiferous shale and sandstone. Typically, the surface layer is fine sandy loam. Below this is fine sandy loam. Soft, gypsiferous shale is at a depth of about 39 inches.

Of minor extent in this unit are Mussel and Yamo soils and Rock outcrop.

This unit is used as wildlife habitat or for limited livestock grazing.

This unit is highly valued as critical winter range for mule deer. It also provides habitat for cottontail, green-tailed towhee, various birds of prey, and a few elk late in winter.

7. Jerry-Uracca-Mergel

Gently sloping to very steep, well drained, deep soils; on alluvial fans, terraces, valley sides, and hills

This map unit is in the southern part of the survey area. Slope is 1 to 65 percent. The vegetation is mainly grasses, forbs, and woody shrubs. Elevation is 7,800 to 9,500 feet. The average annual precipitation is about 16 to 20 inches, the average annual air temperature is 37 to 43 degrees F, and the average frost-free season is 70 to 95 days.

This unit makes up 2 percent of the survey area. It is 40 percent Jerry and similar soils, 25 percent Uracca and similar soils, 20 percent Mergel and similar soils, and 15 percent soils of minor extent.

Jerry soils are on alluvial fans and hills. These soils are gently sloping to very steep. They formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is loam. The subsoil is channery clay loam. Below this to a depth of 50 inches is very channery clay loam.

Uracca soils are on alluvial fans, terraces, and valley sides. These soils are gently sloping to very steep. They formed in mixed alluvium. Typically, the surface layer is cobbly sandy loam. The subsoil is very cobbly sandy clay loam. Below this to a depth of 60 inches is extremely cobbly sandy clay loam.

Mergel soils are on terraces and concave valley side slopes. These soils are gently sloping to very steep. They formed in alluvium and mixed glacial outwash. Typically, the surface layer is cobbly loam. The next layer is very cobbly sandy loam. Below this to a depth of 60 inches is extremely stony sandy loam.

Of minor extent in this unit are Empedrado, Millerlake, Acree, Morval, and Tridell soils.

This unit is used mainly as pasture or irrigated hayland. It also is used for homesite development or rock quarrying.

This unit is used extensively by mule deer in summer, fall, and early winter. The unit also provides important calving and fawning grounds for elk and deer in spring, and it provides habitat for other wildlife, such as cottontail, band-tailed pigeon, blue grouse, and black bear.

If this unit is used for homesite development, the main limitations are stones and boulders.

8. Vandamore-Coulterg

Moderately steep to very steep, well drained, moderately deep and deep soils; on mountainsides and fans

This map unit is in the west-central part of the survey area. Slope is 12 to 65 percent. The vegetation is mainly grasses, woody shrubs, Douglas fir, and juniper. Elevation is 6,500 to 9,500 feet. The average annual precipitation is about 18 to 20 inches, the average annual air temperature is 38 to 43 degrees F, and the average frost-free season is 55 to 80 days.

This unit makes up about 2 percent of the survey area. It is about 54 percent Vandamore soils, 42 percent Coulterg soils, and 4 percent soils of minor extent.

Vandamore soils are on mountainsides. These soils are steep and very steep and are moderately deep. They formed in residuum and colluvium derived dominantly from sandstone. Typically, the surface layer is channery sandy loam. The next layer is very channery loam. Below this is very channery fine sandy loam. Fine-grained sandstone is at a depth of about 27 inches.

Coulterg soils are on mountainsides and on colluvial and alluvial fans. These soils are moderately steep to very steep and are deep. They formed in alluvium and colluvium derived dominantly from siltstone, shale, and limestone. Typically, the soils are loam to a depth of 60 inches.

Of minor extent in this unit are Evanston soils.

This unit is used as rangeland or as wildlife habitat. It provides excellent summer range for mule deer and elk. These animals use the unit extensively for calving, fawning, and raising their young. Other common species are blue grouse, cottontail, snowshoe hare, hairy woodpecker, mountain bluebird, coyote, and black bear.

Dominantly Cold Soils in the Mountains

These soils make up about 51 percent of the survey area.

9. Callings-Yeljack

Moderately steep to very steep, well drained, deep soils; on ridgetops, mountainsides, and benches

This map unit is in the central part of the survey area. Slope is 12 to 65 percent. The vegetation is mainly aspen, woody shrubs, grasses, and forbs. Elevation is 7,500 to 9,500 feet. The average annual precipitation is about 18 to 20 inches, the average annual air temperature is 39 to 41 degrees F, and the average frost-free season is 70 to 80 days.

This unit makes up about 2 percent of the survey area. It is about 41 percent Callings soils, 38 percent Yeljack soils, and 21 percent soils of minor extent.

Callings soils are on convex ridgetops and mountainsides. These soils are moderately steep to very steep. They formed in alluvium and colluvium derived dominantly from sandstone. Typically, the surface layer is loam. The next layer is gravelly loam and very cobbly clay loam. The subsoil is very gravelly clay loam. Below this to a depth of 60 inches is very cobbly sandy clay loam.

Yeljack soils are on mountainsides and benches. These soils are moderately steep to very steep. They formed in alluvium derived dominantly from sandstone and loess. Typically, the surface layer is silt loam. The next layer is silty clay loam and clay loam. The subsoil to a depth of 60 inches or more is clay loam.

Of minor extent in this unit are Ansel and Anvik soils.

This unit is used for livestock grazing or wildlife habitat. It provides good summer and fall habitat for elk and mule deer. Other common wildlife species are blue grouse, ruby-crowned kinglet, cottontail, porcupine, and black bear.

10. Jerry-Cochetopa-Forsey

Gently sloping to very steep, well drained, deep soils; on alluvial fans, hills, valley sides, mountainsides, and ridges

This map unit is throughout the survey area. Slope is 1 to 65 percent. The vegetation is mainly grasses, forbs, and woody shrubs. Elevation is 7,500 to 10,500 feet. The average annual precipitation is about 17 to 20 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free season is 45 to 85 days.

This unit makes up about 44 percent of the survey area. It is about 33 percent Jerry and similar soils, 30 percent Cochetopa and similar soils, 20 percent Forsey and similar soils, and 17 percent soils of minor extent.

Jerry soils are on alluvial fans and hills. These soils are gently sloping to very steep. They formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is loam. The subsoil is channery clay loam. Below this to a depth of 60 inches is very channery clay loam.

Cochetopa soils are on alluvial fans and valley sides. These soils are strongly sloping to steep. They formed in alluvium derived dominantly from basalt. Typically, the surface layer is loam. Below this to a depth of 60 inches is clay loam.

Forsey soils are on fans, mountainsides, and ridges. These soils are gently sloping to very steep. They formed in colluvium, alluvium, and residuum. Typically, the surface layer is cobbly loam. The subsoil is very cobbly clay loam. Below this to a depth of 60 inches is very cobbly sandy clay loam.

Of minor extent in this unit are Antrobus, Millerlake, Dollard, Ansel, Kobar, and Anvik soils.

This unit is used mainly for rangeland, pasture, or homesite development.

This unit has limited value for providing cover for elk and mule deer, but the area is used by these animals for feeding and during migrations. Other wildlife species are cottontail, blue grouse, sage grouse, badger, and coyote. The unit encompasses an area designated as critical habitat for peregrine falcons.

11. Leavittville-Anvik-Ansel

Gently sloping to very steep, well drained, deep soils; on mesas, alluvial fans, and mountainsides

This map unit is in the northwestern part of the survey area. Slope is 4 to 50 percent. The vegetation is mainly conifers, woody shrubs, and grasses. Elevation is 7,500 to 9,500 feet. The average annual precipitation is about 17 to 22 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free season is 60 to 85 days.

This unit makes up about 4 percent of the survey area. It is about 31 percent Leavittville and similar soils, 26 percent Anvik and similar soils, 23 percent Ansel and similar soils, and 20 percent soils of minor extent.

Leavittville soils are on mesas. These soils are gently sloping to steep. They formed in residuum derived dominantly from limestone and sandstone. Typically, the surface layer is loam. Below this is gravelly clay loam. Soft limestone is at a depth of 50 inches.

Anvik soils are on alluvial fans and mountainsides. These soils are moderately steep to very steep. They formed in mixed alluvium and colluvium. Typically, the surface layer is loam. Below this to a depth of 60 inches is cobbly clay loam.

Ansel soils are on fans and foot slopes. These soils are moderately steep and steep. They formed in mixed alluvium. Typically, the surface layer is loam. The subsoil is stony clay loam. Below this to a depth of 60 inches is clay loam.

Of minor extent in this unit are Jerry, Skylick, Sligting, Millerlake, Starley, and Starman soils.

This unit is used for livestock grazing or wildlife habitat. Wildlife species include blue grouse, cottontail, hairy woodpecker, coyote, black bear, mule deer, elk, snowshoe hare, and goshawk. Deer inhabit the unit from late spring to early winter. Elk use the unit during migration.

12. Moen-Woodhall-Ipson

Gently sloping to very steep, well drained, moderately deep and deep soils; on uplands, valley sides, mountainsides, ridges, terraces, and fans

This map unit is in the northwestern part of the survey area. Slope is 1 to 50 percent. The vegetation is mainly grasses, woody shrubs, Douglas fir, pinyon, and oak. Elevation is 6,500 to 9,500 feet. The average annual precipitation is about 13 to 22 inches, the average annual air temperature is 38 to 46 degrees F, and the average frost-free season is 60 to 90 days.

This unit makes up about 1 percent of the survey area. It is about 50 percent Moen soils, 33 percent Woodhall soils, 7 percent Ipson soils, and 10 percent soils of minor extent.

Moen soils are on uplands and valley side slopes. These soils are gently sloping to steep and are moderately deep. They formed in colluvium and residuum derived dominantly from granite and schist. Typically, the surface layer is stony loam. The next layer is gravelly loam. Below this is gravelly sandy clay loam. Hard, noncalcareous Dakota sandstone is at a depth of 22 inches.

Woodhall soils are on mountainsides and ridges. These soils are strongly sloping to very steep and are moderately deep. They formed in residuum and alluvium derived dominantly from sandstone and basalt. Typically, the surface layer is very stony loam. The next layer is very gravelly loam. The subsoil is extremely cobbly clay loam. Hard sandstone is at a depth of about 25 inches.

Ipson soils are on terraces and fans. These soils are gently sloping to very steep and are deep. They formed in alluvium and outwash derived dominantly from sandstone and basalt. Typically, the surface layer is cobbly loam. The subsoil is very gravelly sandy clay loam and gravelly sandy clay loam. Below this to a depth of 60 inches is very gravelly sandy clay loam.

Of minor extent in this unit are Earsman soils and Rock outcrop.

This unit is used mainly as rangeland or as wildlife habitat. It also is used for homesite development.

Mule deer inhabit parts of this unit year-round, but the area is primarily used by deer and elk as winter range. Cottontail, blue grouse, coyote, and rufous-sided towhee also inhabit the unit.

If this unit is used for homesite development, the main limitations are stones and cobbles and the slope.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Acree very stony sandy loam, 3 to 12 percent slopes, is a phase of the Acree series.

Some map units are made up of two or more major soils. These map units are called soil complexes or soil associations.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Atencio-Azeltine complex, 3 to 6 percent slopes, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Ansel-Anvik association, 12 to 25 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Gypsum land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Map Unit Descriptions

1—Acree very stony sandy loam, 3 to 12 percent slopes. This deep, well drained soil is on alluvial fans and valley side slopes. It formed in alluvium and residuum derived dominantly from redbed sandstone and shale. Elevation is 6,500 to 8,200 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 40 to 42 degrees F, and the average frost-free period is 95 to 105 days.

Typically, the upper part of the surface layer is dark grayish brown very stony sandy loam about 5 inches thick. The lower part is clay loam about 5 inches thick. The subsoil is clay about 13 inches thick. The substratum to a depth of 60 inches or more is clay

loam. The soil is noncalcareous to a depth of 27 inches and calcareous below that depth.

Included in this unit are small areas of Showalter, Morval, Cushool, and Evanston soils. Included areas make up about 10 percent of the total acreage.

Permeability is slow in the Acree soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate to severe on the steeper slopes.

This unit is used mainly for irrigated pasture or as hayland. It also is used for homesite development or as rangeland.

The potential plant community on this unit is mainly prairie junegrass, western wheatgrass, bluebunch wheatgrass, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are Indian ricegrass, mountainmahogany, and Douglas rabbitbrush. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, mountain big sagebrush, rabbitbrush, and annual weeds increase in abundance. These plants are dominant when the range is in poor condition; therefore, livestock grazing should be managed so that the desired balance of the preferred species is maintained.

Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Loss of the surface layer severely reduces the ability of the unit to produce plants suitable for grazing.

This unit is well suited to hay and pasture. A seedbed should be prepared on the contour or across the slope where practical. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion. Fertilizer is needed to ensure the optimum growth of grasses and legumes. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

This unit is poorly suited to homesite development. The main limitations are a high shrink-swell potential, low strength, and the slow permeability. Population growth has resulted in increased construction of homes in areas of this soil.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Loamy Slopes range site.

2—Acree very stony sandy loam, 12 to 25 percent slopes. This deep, well drained soil is on alluvial fans and valley side slopes. It formed in alluvium and residuum derived dominantly from redbed sandstone and shale. Elevation is 6,500 to 8,200 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 40 to 42 degrees F, and the average frost-free period is 95 to 105 days.

Typically, the upper part of the surface layer is dark grayish brown very stony sandy loam about 5 inches thick. The lower part is clay loam about 5 inches thick. The subsoil is clay about 13 inches thick. The substratum to a depth of 60 inches or more is clay loam. The soil is noncalcareous to a depth of 27 inches and calcareous below that depth.

Included in this unit are small areas of Showalter, Morval, Cushool, and Evanston soils. Included areas make up about 10 percent of the total acreage.

Permeability is slow in the Acree soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used mainly as rangeland. It also is used as wildlife habitat.

The potential plant community on this unit is mainly prairie junegrass, western wheatgrass, bluebunch wheatgrass, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are Indian ricegrass, mountainmahogany, and Douglas rabbitbrush. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, mountain big sagebrush, rabbitbrush, and annual weeds increase in abundance. These plants are dominant when the range is in poor condition; therefore, livestock grazing should be managed so that the desired balance of the preferred species is maintained.

The suitability of this unit for range seeding is poor. The main limitation is the slope. Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. Livestock grazing should be managed to protect the unit from excessive erosion.

This map unit is in capability subclass VIe, nonirrigated. It is in the Loamy Slopes range site.

3—Acree loam, 3 to 6 percent slopes. This deep, well drained soil is on alluvial fans and valley side slopes. It formed in alluvium and residuum derived dominantly from redbed sandstone and shale. Elevation is 6,500 to 8,200 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 95 to 105 days.

Typically, the surface layer is dark grayish brown loam about 10 inches thick. The upper 4 inches of the subsoil is clay loam. The lower 13 inches is clay. The next layer is clay loam about 7 inches thick. The

substratum to a depth of 60 inches or more is clay loam. The soil is noncalcareous to a depth of 27 inches and calcareous below that depth.

Included in this unit are small areas of Showalter and Morval soils. Included areas make up about 10 percent of the total acreage.

Permeability is slow in the Acree soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate.

This unit is used mainly for irrigated crops or as hayland. It also is used for pasture or homesite development.

The potential plant community on this unit is mainly Letterman needlegrass, Idaho fescue, western wheatgrass, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are slender wheatgrass, lanceleaf rabbitbrush, elk sedge, and scattered Gambel oak. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, lanceleaf rabbitbrush, Kentucky bluegrass, and annual weeds increase in abundance.

If the quality of range vegetation has seriously deteriorated, seeding is needed. The suitability of this unit for range seeding is good.

This unit is well suited to irrigated crops. Corrugation irrigation is suited to this unit. If furrow or corrugation irrigation systems are used, runs should be on the contour or across the slope. Because of the slow permeability in the subsoil, the application of water should be regulated so that water does not stand on the surface and damage the crops. The content of organic matter can be maintained by using all crop residue, plowing under cover crops, and using a suitable rotation. Crops respond to applications of nitrogen and phosphorus fertilizer. If properly managed, the unit can produce 90 bushels of barley per acre annually.

This unit is well suited to hay and pasture. A seedbed should be prepared on the contour or across the slope where practical. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion. Fertilizer is needed to ensure the optimum growth of grasses and legumes. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

This unit is poorly suited to homesite development. The main limitations are a high shrink-swell potential, low strength, and the slow permeability. Structures, sanitary facilities, roads, and landscaping should be designed and planned to reflect these limitations. Population growth has resulted in increased construction of homes in areas of this soil.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Mountain Loam range site.

4—Acree loam, 6 to 12 percent slopes. This deep, well drained soil is on alluvial fans and valley side slopes. It formed in alluvium and residuum derived dominantly from redbed sandstone and shale. Elevation is 6,500 to 8,200 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 95 to 105 days.

Typically, the surface layer is dark grayish brown loam about 10 inches thick. The upper 4 inches of the subsoil is clay loam. The lower 13 inches is clay. The next layer is clay loam about 7 inches thick. The substratum to a depth of 60 inches or more is clay loam. The soil is noncalcareous to a depth of 27 inches and calcareous below that depth.

Included in this unit are small areas of Showalter and Morval soils. Included areas make up about 10 percent of the total acreage.

Permeability is slow in the Acree soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly for irrigated hay or pasture. It also is used as rangeland, for a limited number of irrigated crops, or for homesite development.

The potential plant community on this unit is mainly Letterman needlegrass, Idaho fescue, western wheatgrass, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are slender wheatgrass, lanceleaf rabbitbrush, elk sedge, and scattered Gambel oak. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, lanceleaf rabbitbrush, Kentucky bluegrass, and annual weeds increase in abundance.

If the quality of range vegetation has seriously deteriorated, seeding is needed. The suitability of this unit for range seeding is good.

This unit is well suited to hay and pasture. A seedbed should be prepared on the contour or across the slope where practical. All adapted pasture plants can be grown, but bunch-type species planted alone generally are not suitable because of the hazard of erosion. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion. Fertilizer is needed to ensure the optimum growth of grasses and legumes. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

This unit is suited to irrigated crops. It is limited

mainly by the slope. Corrugation irrigation is suited to this unit. If furrow or corrugation irrigation systems are used, runs should be on the contour or across the slope. Because of the slow permeability in the subsoil, the application of water should be regulated so that water does not stand on the surface and damage the crops. The content of organic matter can be maintained by using all crop residue, plowing under cover crops, and using a suitable rotation. Crops respond to applications of nitrogen and phosphorus fertilizer. If properly managed, the unit can produce 80 bushels of barley per acre annually.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential, low strength, and the slow permeability. Structures, sanitary facilities, roads, and landscaping should be designed and planned to reflect these limitations. Population growth has resulted in increased construction of homes on this soil.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Mountain Loam range site.

5—Acree loam, 12 to 25 percent slopes. This deep, well drained soil is on alluvial fans and valley side slopes. It formed in alluvium and residuum derived dominantly from redbed sandstone and shale. Elevation is 6,500 to 8,200 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 95 to 105 days.

Typically, the surface layer is dark grayish brown loam about 10 inches thick. The upper 4 inches of the subsoil is clay loam. The lower 13 inches is clay. The next layer is clay loam about 7 inches thick. The substratum to a depth of 60 inches or more is clay loam. The soil is noncalcareous to a depth of 27 inches and calcareous below that depth.

Included in this unit are small areas of Showalter and Morval soils. Also included are small areas of soils that are similar to the Acree soil but are coarser textured. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Acree soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland. It also is used as wildlife habitat.

The potential plant community on this unit is mainly Letterman needlegrass, Idaho fescue, western wheatgrass, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are slender wheatgrass, lanceleaf rabbitbrush, elk sedge, and Gambel oak. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, lanceleaf rabbitbrush, Kentucky bluegrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is fair. The main limitation is the slope.

This unit is poorly suited to homesite development. The main limitations are the slope and the shrink-swell potential.

This map unit is in capability subclass VIe, nonirrigated. It is in the Mountain Loam range site.

6—Almy loam, 1 to 12 percent slopes. This deep, well drained soil is on fans and uplands. It formed in alluvium derived dominantly from calcareous redbed sandstone and shale. Elevation is 6,000 to 7,800 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is reddish brown loam about 8 inches thick. The upper 3 inches of the subsoil is fine sandy loam. The lower 15 inches is sandy clay loam. The substratum to a depth of 60 inches or more is fine sandy loam. The soil is noncalcareous to a depth of 11 inches and calcareous below that depth.

Included in this unit are small areas of Empedrado soils. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Almy soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or hayland. The potential plant community is mainly bluebunch wheatgrass, Indian ricegrass, bottlebrush squirreltail, Douglas rabbitbrush, and Wyoming big sagebrush. Prairie junegrass, needleandthread, and Sandberg bluegrass also are included. The average annual production of air-dry vegetation is about 950 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is good. Loss of the surface layer severely reduces the ability of the unit to produce plants suitable for grazing.

This unit is well suited to hay and pasture. It has few limitations. Grasses and legumes grow well if adequate fertilizer is used. If properly managed, the unit can produce 5 tons of irrigated grass hay per acre annually.

This unit is well suited to homesite development.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Rolling Loam range site.

7—Almy loam, 12 to 25 percent slopes. This deep, well drained soil is on fans and uplands. It formed in alluvium derived dominantly from calcareous redbed sandstone and shale. Elevation is 6,000 to 7,800 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is reddish brown loam about 8 inches thick. The upper 3 inches of the subsoil is fine sandy loam. The lower 15 inches is sandy clay loam. The substratum to a depth of 60 inches or more is fine sandy loam. The soil is noncalcareous to a depth of 11 inches and calcareous below that depth.

Included in this unit are small areas of Empedrado soils and soils that are similar to the Almy soil but are calcareous within a depth of 10 inches. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Almy soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland. The potential plant community is mainly bluebunch wheatgrass, Indian ricegrass, bottlebrush squirreltail, Douglas rabbitbrush, and Wyoming big sagebrush. Prairie junegrass, needleandthread, and Sandberg bluegrass also are included. The average annual production of air-dry vegetation is about 950 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Range seeding may be needed if the range is in poor condition. The suitability of this unit for range seeding is fair. The main limitation is the slope. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase.

If this unit is used for homesite development, the main limitation is the slope.

This map unit is in capability subclass VIe, nonirrigated. It is in the Rolling Loam range site.

8—Ansel-Anvik association, 12 to 25 percent slopes. This map unit is on fans, foot slopes, and mountainsides. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 70 to 80 days.

This unit is about 70 percent Ansel soil and 20 percent Anvik soil. The Ansel soil is on fans and foot slopes, and the Anvik soil is on fans and mountainsides.

Included in this unit are small areas of Skylick, Sligting, and Gothic soils. Included areas make up about 10 percent of the total acreage.

The Ansel soil is deep and well drained. It formed in alluvium derived dominantly from material of mixed mineralogy. Typically, the surface layer is light brownish gray loam about 23 inches thick. The upper 25 inches of the subsoil is stony clay loam. The lower part to a depth of 60 inches is clay loam.

Permeability is moderately slow in the Ansel soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

The Anvik soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from material of mixed mineralogy. Typically, the surface layer is grayish brown loam about 12 inches thick. The subsurface layer is light gray loam about 6 inches thick. The subsoil is cobbly clay loam about 24 inches thick. The substratum to a depth of 60 inches is cobbly clay loam.

Permeability is moderate in the Anvik soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland (fig. 3) or as wildlife habitat. It is well suited to the production of Douglas fir. Based on a site index of 91, it can produce about 8,700 cubic feet, or 52,200 board feet (International rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

This unit is poorly suited to homesite development. The main limitations are the slope and the hazard of slumping in areas where excavations or road cuts are made.

This map unit is in capability subclass VIe, nonirrigated. It is in the Spruce-Fir woodland site.

9—Ansel-Anvik association, 25 to 45 percent slopes. This map unit is on fans, foot slopes, and mountainsides. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 70 to 80 days.

This unit is about 70 percent Ansel soil and 20 percent Anvik soil. The Ansel soil is on fans and foot slopes, and the Anvik soil is on fans and mountainsides.

Included in this unit are small areas of Skylick, Sligting, and Gothic soils. Included areas make up about 10 percent of the total acreage.

The Ansel soil is deep and well drained. It formed in alluvium derived dominantly from material of mixed mineralogy. Typically, the surface layer is light brownish gray loam about 23 inches thick. The upper 25 inches

Figure 3.—A wooded area of Ansel-Anvik association, 12 to 25 percent slopes.

of the subsoil is stony clay loam. The lower part to a depth of 60 inches is clay loam.

Permeability is moderately slow in the Ansel soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

The Anvik soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from material of mixed mineralogy. Typically, the surface layer is grayish brown loam about 12 inches thick. The subsurface layer is light gray loam about 6 inches thick. The subsoil is cobbly clay loam about 24 inches thick. The substratum to a depth of 60 inches is cobbly clay loam.

Permeability is moderate in the Anvik soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used as woodland or as wildlife habitat. It is suited to the production of Douglas fir. Based on a site index of 85, it can produce about 7,700 cubic feet, or 46,200 board feet (International rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. The main concern in producing and harvesting timber is the slope. Applying conventional harvest methods is difficult because of this limitation.

This unit is poorly suited to homesite development. The main limitations are the slope and the hazard of slumping in areas where excavations or road cuts are made.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Spruce-Fir woodland site.

10—Anvik-Skylick-Sligting association, 10 to 25 percent slopes. This map unit is on fans and mountainsides. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 70 to 80 days.

This unit is about 30 percent Anvik soil, 30 percent Skylick soil, and 30 percent Sligting soil.

Included in this unit are small areas of Cochetopa, Antrobus, Jerry, Forsey, Coulterg, and Ansel soils. Included areas make up about 10 percent of the total acreage.

The Anvik soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from material of mixed mineralogy. Typically, the surface layer is grayish brown loam about 12 inches thick. The subsurface layer is light gray loam about 6 inches thick. The subsoil is cobbly clay loam about 24 inches thick. The substratum to a depth of 60 inches is cobbly clay loam.

Permeability is moderate in the Anvik soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

The Skylick soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone. Typically, the surface layer is very dark grayish brown loam about 31 inches thick. The upper 17 inches of the subsoil is clay loam. The lower part to a depth of 60 inches is gravelly sandy clay loam.

Permeability is moderately slow in the Skylick soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

The Sligting soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone and basalt. Typically, the surface layer is very dark grayish brown very stony loam about 24 inches thick. The next 6 inches is extremely cobbly clay loam. The upper 6 inches of the subsoil is very cobbly clay. The lower part to a depth of 60 inches or more is very stony clay.

Permeability is slow in the Sligting soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland, wildlife habitat, or rangeland. It is well suited to the production of aspen. Based on a site index of 65, it can produce about 2,880 cubic feet, or 1,500 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 80 years old.

The potential plant community on this unit is mainly bearded wheatgrass, fescues, native bromes, and mountain snowberry. Other plants that characterize this site are native needlegrasses, forbs, and shrubs. If the range condition deteriorates, Canada thistle, Kentucky bluegrass, and timothy are among the plants that increase in abundance. The potential production of the native understory vegetation in normal years is about 3,000 pounds of air-dry vegetation per acre.

This unit is poorly suited to homesite development. The main limitations are the slope, the shrink-swell potential, and the hazard of slumping in areas where excavations or road cuts are made.

This map unit is in capability subclass VIe, nonirrigated. It is in the Aspen woodland site.

11—Anvik-Skylick-Sligting association, 25 to 50 percent slopes. This map unit is on fans and mountainsides. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 70 to 80 days.

This unit is about 30 percent Anvik soil, 30 percent Skylick soil, and 30 percent Sligting soil.

Included in this unit are small areas of Cochetopa, Antrobus, Jerry, Forsey, Coulterg, and Ansel soils. Included areas make up about 10 percent of the total acreage.

The Anvik soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from material of mixed mineralogy. Typically, the surface layer is grayish brown loam about 12 inches thick. The subsurface layer is light gray loam about 6 inches thick. The subsoil is cobbly clay loam about 24 inches thick. The substratum to a depth of 60 inches is cobbly clay loam.

Permeability is moderate in the Anvik soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

The Skylick soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone. Typically, the surface layer is very dark grayish brown loam about 31 inches thick. The upper 17 inches of the subsoil is clay loam. The lower part to a depth of 60 inches is gravelly sandy clay loam.

Permeability is moderately slow in the Skylick soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

The Sligting soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone and basalt. Typically, the surface layer is very dark grayish brown very stony loam about 24 inches thick. The next 6 inches is extremely cobbly clay loam. The upper 6 inches of the subsoil is very cobbly clay loam. The lower part to a depth of 60 inches is very stony clay.

Permeability is slow in the Sligting soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used as woodland, wildlife habitat, or rangeland. It is well suited to the production of aspen. Based on a site index of 60, it can produce about 2,560 cubic feet, or 1,000 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 80 years old. The main concern in producing and harvesting timber is the slope. Applying conventional harvest methods is difficult because of this limitation.

The potential plant community on this unit is mainly bearded wheatgrass, fescues, native bromes, and mountain snowberry. Other plants that characterize this site are native needlegrasses, forbs, and shrubs. If the range condition deteriorates, Canada thistle, Kentucky bluegrass, and timothy are among the plants that increase in abundance. The potential production of the native understory vegetation in normal years is about 3,000 pounds of air-dry vegetation per acre.

This unit is poorly suited to homesites. The main limitations are the slope, the shrink-swell potential, and the hazard of slumping in areas where excavations or road cuts are made.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Aspen woodland site.

12—Arle-Ansari-Rock outcrop complex, 12 to 50 percent slopes. This map unit is on mountain and valley side slopes and ridges. Elevation is 6,000 to 8,200 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 80 to 100 days.

This unit is about 40 percent Arle very stony loam, 30 percent Ansari loam, and 20 percent Rock outcrop.

Included in this unit are small areas of Morval soils in valley fill areas. Also included are small areas of soils that are similar to the included Morval soils but have a higher content of clay. Included areas make up about 10 percent of the total acreage.

The Arle soil is moderately deep and well drained. It formed in residuum derived dominantly from redbed sandstone and shale. About 20 to 40 percent of the surface is covered with cobbles and channery fragments. Typically, the surface layer is reddish brown very stony loam about 10 inches thick. The subsoil is very stony loam about 8 inches thick. The substratum to a depth of 30 inches is very stony loam. The depth to bedrock ranges from 20 to 40 inches. The soil is mildly alkaline to a depth of 10 inches and moderately alkaline below that depth. A thin layer of partially decomposed needles, twigs, and leaves is on the surface in many places.

Permeability is moderate in the Arle soil. Available water capacity is very low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight to severe on the steeper slopes.

The Ansari soil is shallow and well drained. It formed in residuum derived dominantly from redbed sandstone and shale. Typically, the surface layer is reddish brown loam about 8 inches thick. The upper 6 inches of the substratum is loam. Hard, calcareous sandstone is at a depth of about 14 inches. The depth to bedrock ranges from 10 to 20 inches. The soil is moderately alkaline and calcareous throughout. A thin layer of partially decomposed needles, twigs, and leaves is on the surface in many places.

Permeability is moderate in the Ansari soil. Available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is slight to severe on the steeper slopes.

The Rock outcrop consists of nearly barren exposures of sandstone.

This unit is used mainly as rangeland. It also is used as wildlife habitat or for homesite development.

The potential plant community on this unit is mainly western wheatgrass, Indian ricegrass, Ross sedge, true mountainmahogany, antelope bitterbrush, and mountain big sagebrush. Bottlebrush squirreltail, Utah serviceberry, and scattered pinyon pine, Utah juniper, and Gambel oak commonly are also included. The average annual production of air-dry vegetation is about 900 pounds per acre on the Arle soil and about 700 pounds per acre on the Ansari soil. If the range condition deteriorates, mountain big sagebrush, rubber rabbitbrush, needleandthread, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. The suitability of this soil for range seeding is poor. The main limitations are the slope, stones on the surface, and the Rock outcrop. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. Loss of the surface layer severely reduces the ability of the unit to produce plants suitable for grazing.

If this unit is used for homesite development, the main limitations are the slope and the depth to bedrock. The cuts needed to provide essentially level building sites can expose bedrock. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Loamy Slopes range site.

13—Atencio-Azeltine complex, 3 to 6 percent slopes. This map unit is on alluvial fans and terraces. The native vegetation is mainly grasses and shrubs. Elevation is 5,900 to 6,500 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is 44 to 46 degrees F, and the average frost-free period is 105 to 120 days.

This unit is about 60 percent Atencio sandy loam and 30 percent Azeltine gravelly sandy loam.

Included in this unit are small areas of soils that are similar to the Atencio and Azeltine soils but are finer textured. Also included are small areas of gravel bars. Included areas make up about 10 percent of the total acreage.

The Atencio soil is deep and well drained. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is reddish gray sandy loam about 6 inches thick. The next layer is sandy loam about 4 inches thick. The subsoil is about 10 inches of sandy clay loam over about 4 inches of gravelly sandy loam. The upper 6 inches of the substratum is gravelly sandy loam. The lower part to a depth of 60 inches is very gravelly sand. The soil is noncalcareous to a depth of 20 inches and calcareous below that depth. In some areas the surface layer is gravelly or cobbly.

Permeability is moderate to a depth of 30 inches in the Atencio soil and rapid below this depth. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Azeltine soil is deep and well drained. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is reddish gray gravelly sandy loam about 9 inches thick. The upper 7 inches of the substratum is gravelly loam. The lower part to a depth of 60 inches is extremely gravelly sand. The soil is calcareous throughout. In some areas the surface layer is cobbly loam or sandy loam.

Permeability is rapid or very rapid below a depth of 16 inches in the Azeltine soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for irrigated hay or pasture. It also is used for crops, urban development, wildlife habitat, or rangeland.

If this unit is used for hay and pasture, the main limitations are the low available water capacity and small stones. Grasses and legumes grow well if adequate fertilizer is used. Good management helps to maintain optimum vigor and quality of forage plants. Because these soils are droughty, applications of irrigation water should be light and frequent. Irrigation water can be applied by corrugation, sprinkler, and flooding methods. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

This unit is moderately well suited to irrigated crops. If furrow or corrugation irrigation systems are used, runs should be on the contour or across the slope. If properly managed, the unit can produce 70 bushels of barley per acre annually.

The potential plant community on this unit is mainly western wheatgrass, Indian ricegrass, needleandthread, big sagebrush, and Douglas rabbitbrush. Nevada bluegrass, prairie junegrass, and bottlebrush squirreltail also are included. The average annual production of air-dry vegetation is about 800 pounds per acre. Suitable management practices include proper grazing use and a planned grazing system.

If the quality of range vegetation has seriously deteriorated, seeding is needed. The main limitations are cobbles and stones. For successful seeding, a seedbed should be prepared and the seed drilled. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

If this unit is used for homesite development, the main limitation is small stones. Population growth has resulted in increased construction of homes in areas of this unit. Topsoil can be stockpiled and used to reclaim areas disturbed during construction. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage from onsite sewage disposal systems.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated. It is in the Rolling Loam range site.

14—Callings-Yeljack complex, 25 to 65 percent slopes. This map unit is on ridgetops, benches, and mountainsides. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 39 to 41 degrees F, and the average frost-free period is 70 to 80 days.

This unit is about 50 percent Callings soil and 40 percent Yeljack soil.

Included in this unit are small areas of Mine, Arle, Ansari, Jerry, Millerlake, Uracca, and Mergel soils. Included areas make up about 10 percent of the total acreage.

The Callings soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from sandstone. Typically, the surface layer is dark brown loam about 5 inches thick. The next 6 inches is gravelly loam. The subsurface layer is very cobbly clay loam

about 22 inches thick. The subsoil is very gravelly clay loam about 19 inches thick. The substratum to a depth of 60 inches is very gravelly sandy clay loam.

Permeability is slow in the Callings soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is slight or moderate on the steeper slopes.

The Yeljack soil is deep and well drained. It formed in alluvium derived dominantly from sandstone and loess. Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsurface layer is clay loam about 8 inches thick. The next 14 inches is silty clay loam. The subsoil to a depth of 60 inches or more is clay loam.

Permeability is moderately slow in the Yeljack soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used as rangeland or as wildlife habitat.

The potential plant community on the Callings soil is mainly mountain brome, elk sedge, big bluegrass, and Gambel oak. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, Saskatoon serviceberry, Gambel oak, and mountain snowberry increase in abundance. If the condition of the range further deteriorates, rabbitbrush, cheatgrass, and Canada thistle increase in abundance. The main limitations are the slope and restricted access.

The potential plant community on the Yeljack soil is mainly Arizona fescue, slender wheatgrass, and mountain brome. Other plants that characterize this site are Letterman needlegrass and pine needlegrass. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, tall rabbitbrush and phlox increase in abundance. Important management concerns in areas of irrigated hay and pasture are increasers, such as Kentucky bluegrass. The main limitations are the slope and restricted access.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. The Callings soil is in the Brushy Loam range site, and the Yeljack soil is in the Mountain Loam range site.

15—Charcol-Mord complex, 12 to 25 percent slopes. This map unit is on mountain and valley side slopes. Elevation is 8,000 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 39 to 41 degrees F, and the average frost-free period is 70 to 80 days.

This unit is about 60 percent Charcol soil and 30 percent Mord soil.

Included in this unit are small areas of Jerry, Anvik, Skylick, Sligting, Curecanti, Fughes, and Forsey soils. Included areas make up about 10 percent of the total acreage.

The Charcol soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone and quartzite. Typically, the surface layer is brown very stony fine sandy loam about 20 inches thick. The subsurface layer is very cobbly loam about 26 inches thick. The subsoil to a depth of 60 inches is very cobbly sandy clay loam.

Permeability is moderate in the Charcol soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

The Mord soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone and quartzite. Typically, the surface layer is dark grayish brown fine sandy loam about 10 inches thick. The subsurface layer is sandy clay loam about 11 inches thick. The subsoil to a depth of 60 inches is cobbly clay.

Permeability is slow in the Mord soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland or as wildlife habitat. It is suited to the production of lodgepole pine. Based on a site index of 60, it can produce about 5,000 cubic feet of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old *(3)*. Harvesting some of the mature trees for sawtimber and thinning dense stands of younger trees for use as poles increase the growth rate of the rest of the stand and increase the understory vegetation.

This unit is poorly suited to homesite development. The main limitations are the slope, small stones, and seepage.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Lodgepole Pine woodland site.

16—Charcol-Mord complex, 25 to 50 percent slopes. This map unit is on mountain and valley side slopes. Elevation is 8,000 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 39 to 41 degrees F, and the average frost-free period is 70 to 80 days.

This unit is about 60 percent Charcol soil and 30 percent Mord soil.

Included in this unit are small areas of Jerry, Anvik, Skylick, Sligting, Curecanti, Fughes, and Forsey soils.

Included areas make up about 10 percent of the total acreage.

The Charcol soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone and quartzite. Typically, the surface layer is brown very stony fine sandy loam about 20 inches thick. The subsurface layer is very cobbly loam about 26 inches thick. The subsoil to a depth of 60 inches is very cobbly sandy clay loam.

Permeability is moderate in the Charcol soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

The Mord soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone and quartzite. Typically, the surface layer is dark grayish brown fine sandy loam about 10 inches thick. The subsurface layer is sandy clay loam about 11 inches thick. The subsoil to a depth of 60 inches is cobbly clay.

Permeability is slow in the Mord soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used as woodland or as wildlife habitat. It is suited to the production of lodgepole pine. Based on a site index of 50, it can produce about 4,100 cubic feet of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old *(3)*. The main concern in producing and harvesting timber is the slope. Applying conventional harvest methods is difficult because of this limitation.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Lodgepole Pine woodland site.

17—Cochetopa-Antrobus association, 6 to 12 percent slopes. This map unit is on mountainsides and fans. Elevation is 8,500 to 10,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 36 to 38 degrees F, and the average frost-free period is 45 to 60 days.

This unit is about 50 percent Cochetopa loam and 30 percent Antrobus very stony loam. The Cochetopa soil is in broad, slightly concave areas, and the Antrobus soil is on the steeper convex slopes.

Included in this unit are small areas of Forsey and Jerry soils. Included areas make up about 20 percent of the total acreage.

The Cochetopa soil is deep and well drained. It formed in alluvium derived dominantly from basalt. Slope is 6 to 12 percent. Typically, the upper part of the surface layer is dark grayish brown loam about 3 inches thick. The lower part is very dark grayish brown clay loam about 11 inches thick. The subsoil is clay loam about 24 inches thick. The substratum to a depth of 60 inches or more is gravelly clay loam. The soil is noncalcareous to a depth of 40 to 60 inches and calcareous below that depth.

Permeability is slow in the Cochetopa soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

The Antrobus soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from basalt. Slope is 10 to 12 percent. About 10 to 15 percent of the surface is covered with stones, and 20 percent is covered with cobbles. Typically, the upper part of the surface layer is dark grayish brown very stony loam about 8 inches thick. The lower part is brown very stony loam about 5 inches thick. The substratum to a depth of 60 inches or more is extremely stony loam. The soil is calcareous throughout.

Permeability is moderate in the Antrobus soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland or for homesite development.

The potential plant community on the Cochetopa soil is mainly Thurber fescue, bearded wheatgrass, Columbia needlegrass, mountain brome, and Idaho fescue. Western wheatgrass, mountain snowberry, geranium, and western yarrow also are included. The average annual production of air-dry vegetation is about 2,800 pounds per acre. If the range condition deteriorates, Kentucky bluegrass, geranium, Douglas rabbitbrush, and western yarrow increase in abundance.

The potential plant community on the Antrobus soil is mainly bluebunch wheatgrass, needlegrasses, antelope bitterbrush, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are Douglas rabbitbrush and mountain snowberry. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, needlegrasses, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. The main limitations are the stones on the surface and the low available water capacity. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

If this unit is used for homesite development, the main limitations are a high shrink-swell potential and the

stoniness. Buildings and roads should be designed to offset the effects of shrinking and swelling. The high content of rock fragments makes excavation difficult.

This map unit is in capability subclass VIe, nonirrigated. The Cochetopa soil is in the Subalpine Loam range site, and the Antrobus soil is in the Stony Loam range site.

18—Cochetopa-Antrobus association, 12 to 25 percent slopes. This map unit is on mountainsides and fans. Elevation is 8,500 to 10,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 36 to 38 degrees F, and the average frost-free period is 45 to 60 days.

This unit is about 45 percent Cochetopa loam and 35 percent Antrobus very stony loam. The Cochetopa soil is in broad, slightly concave areas, and the Antrobus soil is on the steeper convex slopes.

Included in this unit are small areas of Forsey and Jerry soils. Included areas make up about 20 percent of the total acreage.

The Cochetopa soil is deep and well drained. It formed in alluvium derived dominantly from basalt. Slope is 12 to 20 percent. Typically, the upper part of the surface layer is dark grayish brown loam about 3 inches thick. The lower part is very dark grayish brown clay loam about 11 inches thick. The subsoil is clay loam about 24 inches thick. The substratum to a depth of 60 inches or more is gravelly clay loam. The soil is noncalcareous to a depth of 40 to 60 inches and calcareous below that depth.

Permeability is slow in the Cochetopa soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

The Antrobus soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from basalt. Slope is 15 to 25 percent. About 12 to 15 percent of the surface is covered with stones, and 25 percent is covered with cobbles. Typically, the upper part of the surface layer is dark grayish brown very stony loam about 8 inches thick. The lower part is brown very stony loam about 5 inches thick. The substratum to a depth of 60 inches or more is extremely stony loam. The soil is calcareous throughout.

Permeability is moderate in the Antrobus soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland or for homesite development.

The potential plant community on the Cochetopa soil is mainly Thurber fescue, bearded wheatgrass, Columbia needlegrass, mountain brome, and Idaho fescue. Western wheatgrass, mountain snowberry, geranium, western yarrow, and small areas of aspen also are included. The average annual production of air-dry vegetation is about 2,800 pounds per acre. If the range condition deteriorates, Kentucky bluegrass, geranium, Douglas rabbitbrush, and western yarrow increase in abundance.

The potential plant community on the Antrobus soil is mainly bluebunch wheatgrass, needlegrasses, antelope bitterbrush, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are Douglas rabbitbrush and mountain snowberry. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, needlegrasses, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. The main limitations are the slope and the stones on the surface. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management.

If this unit is used for homesite development, the main limitations are a high shrink-swell potential and the stoniness. Buildings and roads should be designed to offset the effects of shrinking and swelling.

This map unit is in capability subclass VIe, nonirrigated. The Cochetopa soil is in the Subalpine Loam range site, and the Antrobus soil is in the Stony Loam range site.

19—Cochetopa-Antrobus association, 25 to 50 percent slopes. This map unit is on mountainsides. Elevation is 8,500 to 10,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 36 to 38 degrees F, and the average frost-free period is 45 to 60 days.

This unit is about 45 percent Cochetopa loam and 40 percent Antrobus very stony loam. The Cochetopa soil is on slightly concave benches, and the Antrobus soil is on the steeper convex slopes.

Included in this unit are small areas of Forsey and Jerry soils. Included areas make up about 15 percent of the total acreage.

The Cochetopa soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from basalt. Slope is 25 to 40 percent. Typically, the upper part of the surface layer is dark grayish brown loam about 3 inches thick. The lower part is very dark grayish brown clay loam about 11 inches thick. The subsoil is clay loam about 24 inches thick. The substratum to a depth of 60 inches is gravelly clay loam. The soil is noncalcareous to a depth of 40 to 60

inches and calcareous below that depth.

Permeability is slow in the Cochetopa soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

The Antrobus soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from basalt. Slope is 30 to 50 percent. About 12 to 15 percent of the surface is covered with stones, and 25 percent is covered with cobbles. Typically, the upper part of the surface layer is dark grayish brown very stony loam about 8 inches thick. The lower part is brown very stony loam about 5 inches thick. The substratum to a depth of 60 inches or more is extremely stony loam. The soil is calcareous throughout.

Permeability is moderate in the Antrobus soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland or for homesite development.

The potential plant community on the Cochetopa soil is mainly Thurber fescue, bearded wheatgrass, Columbia needlegrass, mountain brome, and Idaho fescue. Western wheatgrass, mountain snowberry, geranium, and western yarrow also are included. The average annual production of air-dry vegetation is about 2,800 pounds per acre. If the range condition deteriorates, Kentucky bluegrass, geranium, Douglas rabbitbrush, and western yarrow increase in abundance.

The potential plant community on the Antrobus soil is mainly bluebunch wheatgrass, needlegrass, antelope bitterbrush, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are Douglas rabbitbrush, bluebunch wheatgrass, and antelope bitterbrush. Also included are small areas of aspen. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, needlegrasses, and annual weeds increase in abundance.

Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

If this unit is used for homesite development, the main limitations are the shrink-swell potential, the stoniness, and the slope. Access roads should be designed to provide adequate cut-slope grade, and drains should be used to control surface runoff and keep soil losses to a minimum. The high content of rock fragments makes excavation difficult.

This map unit is in capability subclass VIIe, nonirrigated. The Cochetopa soil is in the Subalpine Loam range site, and the Antrobus soil is in the Stony Loam range site.

20—Coulterg loam, 12 to 50 percent slopes. This deep, well drained soil is on mountainsides and fans. It formed in alluvium and colluvium derived dominantly from siltstone, soft shale, and limestone. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 39 to 43 degrees F, and the average frost-free period is 65 to 80 days.

Typically, the surface layer is dark grayish brown loam about 14 inches thick. The substratum to a depth of 60 inches is loam.

Included in this unit are small areas of Forsey, Jerry, Anvik, Skylick, and Sligting soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Coulterg soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used as woodland or as wildlife habitat. It has limited grazing value. It is not suitable as a source of sawtimber, but it can yield 70 to 90 cords of firewood per acre. After harvesting, carefully managed reforestation helps to control competition from undesirable understory plants. Competing vegetation can be controlled by properly preparing the site and by spraying, cutting, or girdling, which can eliminate unwanted weeds, brush, or trees. Among the trees that are suitable for planting are Douglas fir and lodgepole pine.

This unit is poorly suited to homesite development. The main limitations are the high content of gypsum and the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Douglas Fir woodland site.

21—Curecanti-Fughes complex, 6 to 12 percent slopes. This map unit is on mountainsides and foot slopes. Elevation is 6,500 to 8,300 feet. The average annual precipitation is 14 to 17 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 75 to 90 days.

This unit is about 50 percent Curecanti extremely stony loam and 35 percent Fughes stony loam. The Curecanti soil is on the steeper slopes, and the Fughes soil is on foot slopes.

Included in this unit are small areas of soils that are similar to the Curecanti soil but have more rock fragments throughout the profile. Included areas make

up about 15 percent of the total acreage.

The Curecanti soil is deep and well drained. It formed in colluvium and alluvium derived dominantly from sandstone. About 20 percent of the surface is covered with stones, 15 percent is covered with cobbles, and 25 percent is covered with gravel. Typically, the upper part of the surface layer is brown extremely stony loam about 7 inches thick. The lower part is reddish brown extremely stony loam about 3 inches thick. The upper 37 inches of the subsoil is extremely stony sandy clay loam. The lower 13 inches is extremely cobbly clay loam.

Permeability is moderate in the Curecanti soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Fughes soil is deep and well drained. It formed in alluvium and colluvium. Typically, the upper part of the surface layer is very dark grayish brown stony loam about 10 inches thick. The lower part is very dark grayish brown clay loam about 6 inches thick. The upper 20 inches of the subsoil is clay loam. The lower 10 inches is clay. The next layer to a depth of 60 inches or more is clay loam.

Permeability is slow in the Fughes soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or for homesite development. In some less sloping areas, it is used as hayland.

The potential plant community on the Curecanti soil is mainly bluebunch wheatgrass, western wheatgrass, Letterman needlegrass, mountain big sagebrush, and Saskatoon serviceberry. Muttongrass, antelope bitterbrush, mountain snowberry, and lanceleaf rabbitbrush also are included. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, cheatgrass, and annual weeds increase in abundance.

The potential plant community on the Fughes soil is mainly western wheatgrass, slender wheatgrass, Idaho fescue, and mountain big sagebrush. Other plants that characterize this site are big bluegrass, antelope bitterbrush, Saskatoon serviceberry, and mountain snowberry. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, lanceleaf rabbitbrush, and Kentucky bluegrass increase in abundance.

Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management.

The Fughes soil is moderately well suited to hay and pasture. The main limitations are the stones on the surface in some areas and the slope. If properly managed, this unit can produce 3.5 tons of irrigated grass hay per acre annually.

If the Curecanti soil is used for homesite development, the main limitation is the large stones. The high content of rock fragments makes excavation difficult.

If the Fughes soil is used for urban development, the main limitations are the slow permeability and a high shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content around the foundation. Backfilling excavations with material that has a low shrink-swell potential can also reduce the effects of shrinking and swelling. Septic tank absorption fields of conventional size do not function adequately because of the slow permeability. Other kinds of sewage disposal systems may be needed.

This map unit is in capability subclass VIe, irrigated and nonirrigated. The Curecanti soil is in the Stony Loam range site, and the Fughes soil is in the Mountain Loam range site.

22—Curecanti-Fughes complex, 12 to 25 percent slopes. This map unit is on mountainsides and foot slopes. Elevation is 6,500 to 8,300 feet. The average annual precipitation is 14 to 17 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 75 to 90 days.

This unit is about 55 percent Curecanti very stony loam and 30 percent Fughes stony loam. The Curecanti soil is on the steeper convex slopes, and the Fughes soil is on foot slopes and benches.

Included in this unit are small areas of soils that are similar to the Curecanti soil but have more rock fragments throughout the profile. Included areas make up about 15 percent of the total acreage.

The Curecanti soil is deep and well drained. It formed in colluvium and alluvium derived dominantly from sandstone. About 20 percent of the surface is covered with stones, 15 percent is covered with cobbles, and 25 percent is covered with gravel. Typically, the upper part of the surface layer is brown extremely stony loam about 7 inches thick. The lower part is reddish brown extremely stony loam about 3 inches thick. The upper 37 inches of the subsoil is extremely stony sandy clay loam. The lower 13 inches is extremely cobbly clay loam.

Permeability is moderate in the Curecanti soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate.

The Fughes soil is deep and well drained. It formed in alluvium and colluvium. Typically, the upper part of the surface layer is very dark grayish brown stony loam about 10 inches thick. The lower part is very dark grayish brown stony loam about 6 inches thick. The upper 20 inches of the subsoil is clay loam. The lower 10 inches is clay. The next layer to a depth of 60 inches or more is clay loam.

Permeability is slow in the Fughes soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland or for homesite development. In some of the less sloping areas, it is used as hayland.

The potential plant community on the Curecanti soil is mainly bluebunch wheatgrass, western wheatgrass, Letterman needlegrass, mountain big sagebrush, and Saskatoon serviceberry. Muttongrass, antelope bitterbrush, mountain snowberry, and lanceleaf rabbitbrush also are included. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, cheatgrass, and annual weeds increase in abundance.

The potential plant community on the Fughes soil is mainly western wheatgrass, needlegrass, slender wheatgrass, Idaho fescue, and mountain big sagebrush. Other plants that characterize this site are big bluegrass, Saskatoon serviceberry, and mountain snowberry. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, lanceleaf rabbitbrush, and Kentucky bluegrass increase in abundance.

Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management.

If the Curecanti soil is used for homesite development, the main limitations are the slope and the large stones. The high content of rock fragments makes excavation difficult.

If the Fughes soil is used for homesite development, the main limitations are the slope and the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content around the foundation. Backfilling excavations with material that has a low shrink-swell potential can also reduce the effects of shrinking and swelling. Septic tank absorption fields of conventional size do not function adequately because of the slow permeability. Other kinds of sewage disposal systems may be needed.

This map unit is in capability subclass VIIe, nonirrigated. The Curecanti soil is in the Stony Loam range site, and the Fughes soil is in the Mountain Loam range site.

23—Cushool fine sandy loam, 12 to 25 percent slopes. This moderately deep, well drained soil is on upland hills, ridges, and side slopes. It formed in alluvium derived dominantly from sandstone and shale. Elevation is 6,200 to 7,600 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is grayish brown fine sandy loam about 7 inches thick. The subsoil is loam about 6 inches thick. The upper 13 inches of the substratum is loam. The lower part is extremely channery sandy loam. Soft sandstone is at a depth of about 35 inches.

Included in this unit are small areas of Evanston, Millerlake, Tridell, Forsey, Forelle, and Brownsto soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Cushool soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight or moderate on the steeper slopes.

This unit is used as wildlife habitat or rangeland. The native vegetation is western wheatgrass, needleandthread, squirreltail, sagebrush, and scattered pinyon and juniper. Prairie junegrass, Indian ricegrass, and serviceberry also are included in the potential plant community. The average annual production of the native understory vegetation is about 600 pounds of air-dry vegetation per acre.

This unit is poorly suited to homesite development. The main limitations are the depth to bedrock and the slope.

This map unit is in capability subclass VIe, nonirrigated. It is in the Stony Foothills range site.

24—Cushool fine sandy loam, 25 to 50 percent slopes. This moderately deep, well drained soil is on upland hills and side slopes. It formed in alluvium derived dominantly from sandstone and shale. Elevation is 6,200 to 7,600 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is grayish brown fine sandy loam about 7 inches thick. The subsoil is loam about 6 inches thick. The upper 13 inches of the substratum is loam. The lower part is extremely channery sandy loam. Soft sandstone is at a depth of about 35 inches.

Included in this unit are small areas of Evanston, Millerlake, Tridell, Forsey, Forelle, and Brownsto soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Cushool soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight to severe on the steeper slopes.

This unit is used as wildlife habitat or rangeland. The native vegetation is western wheatgrass, needleandthread, squirreltail, sagebrush, and scattered pinyon and juniper. Prairie junegrass, Indian ricegrass, and serviceberry also are included in the potential plant community. The average annual production of the native understory vegetation is about 600 pounds of air-dry vegetation per acre.

This unit is poorly suited to homesite development. The main limitations are the depth to bedrock and the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Stony Foothills range site.

25—Cushool-Rentsac complex, 15 to 65 percent slopes. This map unit is on mountains and mesa side slopes. Elevation is 6,200 to 7,600 feet. The average annual precipitation is 10 to 15 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 85 to 105 days.

This unit is about 45 percent Cushool soil and 40 percent Rentsac soil.

Included in this unit are small areas of Dollard and Irrawaddy soils and Rock outcrop. Also included are small areas of Tridell soils on ridgetops. Included areas make up about 15 percent of the total acreage.

The Cushool soil is moderately deep and well drained. It formed in residuum derived dominantly from sandstone and shale. Slope is 15 to 50 percent. Typically, the surface layer is grayish brown loam about 7 inches thick. The upper 4 inches of the subsoil is loam. The lower 2 inches is channery loam. The upper 13 inches of the substratum is channery loam. The lower 9 inches is extremely channery sandy loam over soft shale and sandstone. The soil is calcareous throughout. The depth to soft bedrock ranges from 20 to 40 inches. A thin layer of partially decomposed needles, twigs, and leaves is on the surface in many places.

Permeability is moderate in the Cushool soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is severe.

The Rentsac soil is shallow and well drained. It formed in residuum derived dominantly from sandstone. Slope is 25 to 65 percent. Typically, the upper part of the surface layer is grayish brown channery loam about 3 inches thick. The lower part is pale brown channery loam about 3 inches thick. The substratum is extremely channery loam. Sandstone is at a depth of about 18 inches. The soil is calcareous throughout. The depth to bedrock ranges from 8 to 20 inches. A thin layer of partially decomposed needles, twigs, and leaves is on the surface in many places.

Permeability is moderately rapid in the Rentsac soil. Available water capacity is very low. The effective rooting depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used mainly as rangeland or as wildlife habitat. It also is used for Christmas trees or as a source of firewood and posts.

The potential plant community is mainly pinyon pine and Utah juniper with an understory of big sagebrush, Indian ricegrass, bluebunch wheatgrass, and galleta. Rocky Mountain juniper, true mountainmahogany, and bottlebrush squirreltail commonly are also included. If the range condition deteriorates, big sagebrush, cheatgrass, and annual weeds increase in abundance. The average annual production of the native understory vegetation is about 150 pounds of air-dry vegetation per acre. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. Livestock grazing should be managed to protect the unit from excessive erosion. Selective thinning of the pinyon and juniper improves the quality of the understory for grazing and provides firewood, posts, and Christmas trees.

This unit is suited to limited production of pinyon pine and Utah juniper. To ensure sustained yields and continued use, the kind of wood production should be considered before thinning or clearing. Special care is needed to minimize erosion when the stands are thinned and other forest management practices are applied. The low or very low available water capacity generally influences seedling survival in areas where understory plants are numerous.

If this unit is used for homesite development, the main limitations are the slope and the depth to bedrock in areas of the Rentsac soil.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Pinyon-Juniper woodland site.

26—Dahlquist-Southace complex, 6 to 12 percent slopes. This map unit is on alluvial fans, terraces, and terrace side slopes. Elevation is 6,200 to 7,400 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 75 to 95 days.

This unit is about 50 percent Dahlquist soil and 40 percent Southace soil.

Included in this unit are small areas of Yamo and Forelle soils. Also included are small areas of sandstone Rock outcrop. Included areas make up about 10 percent of the total acreage.

The Dahlquist soil is deep and well drained. It formed in alluvium derived from material of mixed mineralogy. Typically, the surface layer is brown cobbly sandy loam about 6 inches thick. The upper 7 inches of the subsoil is very cobbly sandy clay loam. The lower 10 inches is very cobbly sandy loam. The substratum to a depth of 60 inches is extremely cobbly sandy loam. The soil is noncalcareous to a depth of 13 inches and calcareous below that depth.

Permeability is moderate in the Dahlquist soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate.

The Southace soil is deep and well drained. It formed in alluvium derived dominantly from mixed mineralogy. Typically, the surface layer is brown very stony sandy loam about 3 inches thick. The upper 7 inches of the substratum is very stony sandy loam. The next 12 inches is extremely stony sandy loam. The lower part to a depth of 60 inches is extremely stony loamy coarse sand.

Permeability is moderately rapid in the Southace soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as rangeland or for pasture. It also is used for limited homesite development or wildlife browse areas. Both of the major soils are local sources of gravel and crushed rock and are utilized as such in quarry operations.

The potential plant community on the Dahlquist soil is mainly western wheatgrass, bluebunch wheatgrass, prairie junegrass, true mountainmahogany, and big sagebrush. Other plants that characterize this site are antelope bitterbrush, Utah serviceberry, Indian ricegrass, and Douglas rabbitbrush. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, big sagebrush, Douglas rabbitbrush, and cheatgrass increase in abundance.

The potential plant community on the Southace soil is mainly bluebunch wheatgrass, western wheatgrass, Indian ricegrass, big sagebrush, and Utah serviceberry. Other plants that characterize this site are bottlebrush squirreltail, fringed sagebrush, scattered pinyon pine, and Utah juniper. The average annual production of air-dry vegetation is about 600 pounds per acre. If the range condition deteriorates, big sagebrush, fringed sagebrush, cheatgrass, and broom snakeweed increase in abundance.

The suitability of this unit for range seeding is poor. The main limitation is the stoniness. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management. Because of the hazard of seepage, this unit is limited as a site for livestock watering ponds and other water impoundments.

If this unit is used for hay and pasture, the main limitations are the low available water capacity and the stones on the surface. Frequent irrigation is needed. Applications of nitrogen and phosphorus fertilizer improve the growth of forage plants. Rotation grazing helps to maintain the quality of forage. Irrigation water can be applied by sprinkler and flooding methods.

If this unit is used for homesite development, the main limitations are the high content of cobbles and stones and the slope in the steeper areas. Population growth has resulted in increased construction of homes in areas of this unit. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. The effluent from septic tank absorption fields can surface in downslope areas and thus create a health hazard. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage.

This map unit is in capability subclass VIe, irrigated and nonirrigated. The Dahlquist soil is in the Loamy Slopes range site, and the Southace soil is in the Stony Foothills range site.

27—Dahlquist-Southace complex, 12 to 25 percent slopes. This map unit is on alluvial fans, terraces, and terrace side slopes. Elevation is 6,200 to 7,400 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 105 to 115 days.

This unit is about 45 percent Dahlquist soil and 40 percent Southace soil.

Included in this unit are small areas of Yamo and Forelle soils and Gypsiorthids. Also included are small areas of sandstone Rock outcrop. Included areas make up about 15 percent of the total acreage.

The Dahlquist soil is deep and well drained. It formed in alluvium derived from material of mixed mineralogy. Typically, the surface layer is brown cobbly sandy loam about 6 inches thick. The upper 7 inches of the subsoil is very cobbly sandy clay loam. The lower 10 inches is very cobbly sandy loam. The substratum to a depth of 60 inches is extremely cobbly sandy loam. The soil is noncalcareous to a depth of 13 inches and calcareous below that depth.

Permeability is moderate in the Dahlquist soil. Available water capacity is low. The effective rooting

depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

The Southace soil is deep and well drained. It formed in alluvium derived dominantly from mixed mineralogy. Typically, the surface layer is brown very stony sandy loam about 3 inches thick. The upper 7 inches of the substratum is very stony sandy loam. The next 12 inches is extremely stony sandy loam. The lower part to a depth of 60 inches is extremely stony loamy coarse sand. The soil is calcareous throughout.

Permeability is moderately rapid in the Southace soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland. It also is used as wildlife habitat. Both of the major soils are local sources of gravel and crushed rock and are utilized as such in quarry operations.

The potential plant community on the Dahlquist soil is mainly western wheatgrass, bluebunch wheatgrass, prairie junegrass, true mountainmahogany, and big sagebrush. Other plants that characterize this site are antelope bitterbrush, Utah serviceberry, Indian ricegrass, and Douglas rabbitbrush. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, big sagebrush, Douglas rabbitbrush, and cheatgrass increase in abundance.

The potential plant community on the Southace soil is mainly bluebunch wheatgrass, western wheatgrass, Indian ricegrass, big sagebrush, and Utah serviceberry. Other plants that characterize this site are bottlebrush squirreltail, fringed sagebrush, scattered pinyon pine, and Utah juniper. The average annual production of air-dry vegetation is about 600 pounds per acre. If the range condition deteriorates, big sagebrush, fringed sagebrush, cheatgrass, and broom snakeweed increase in abundance.

The suitability of this unit for range seeding is poor. Mechanical treatment is not practical because of the stones on the surface and the slope. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management. Because of the hazard of seepage, this unit is limited as a site for livestock watering ponds and other water impoundments.

If this unit is used for homesite development, the main limitations are the slope and the large stones. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. The slope is a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour.

This map unit is in capability subclass VIe, nonirrigated. The Dahlquist soil is in the Loamy Slopes range site, and the Southace soil is in the Stony Foothills range site.

28—Dahlquist-Southace complex, 25 to 50 percent slopes. This map unit is on alluvial fans, terraces, and terrace side slopes. Elevation is 6,200 to 7,400 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 105 to 115 days.

This unit is about 40 percent Dahlquist soil and 35 percent Southace soil.

Included in this unit are small areas of Yamo soils and Gypsiorthids. Also included are small areas of sandstone Rock outcrop. Included areas make up about 25 percent of the total acreage.

The Dahlquist soil is deep and well drained. It formed in alluvium derived from material of mixed mineralogy. Typically, the surface layer is brown cobbly sandy loam about 6 inches thick. The upper 7 inches of the subsoil is very cobbly sandy clay loam. The lower 10 inches is very cobbly sandy loam. The substratum to a depth of 60 inches is calcareous extremely cobbly sandy loam. The soil is noncalcareous to a depth of 24 inches and calcareous below that depth.

Permeability is moderate in the Dahlquist soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

The Southace soil is deep and well drained. It formed in alluvium. Typically, the surface layer is brown very stony sandy loam about 3 inches thick. The upper 7 inches of the substratum is very stony sandy loam. The next 12 inches is extremely stony sandy loam. The lower part to a depth of 60 inches is extremely stony loamy coarse sand. The soil is calcareous throughout.

Permeability is moderately rapid in the Southace soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used mainly as rangeland. It also is used as wildlife habitat. Both of the major soils are local sources of gravel and crushed rock and are utilized as such in quarry operations.

The potential plant community on the Dahlquist soil is mainly western wheatgrass, bluebunch wheatgrass, prairie junegrass, true mountainmahogany, and big sagebrush. Other plants that characterize this site are antelope bitterbrush, Utah serviceberry, Indian ricegrass, and Douglas rabbitbrush. The average annual production of air-dry vegetation is about 900

pounds per acre. If the range condition deteriorates, big sagebrush, Douglas rabbitbrush, and cheatgrass increase in abundance.

The potential plant community on the Southace soil is mainly bluebunch wheatgrass, western wheatgrass, Indian ricegrass, big sagebrush, and Utah serviceberry. Other plants that characterize this site are bottlebrush squirreltail, fringed sagebrush, scattered pinyon pine, and Utah juniper. The average annual production of air-dry vegetation is about 600 pounds per acre. If the range condition deteriorates, big sagebrush, fringed sagebrush, cheatgrass, and broom snakeweed increase in abundance.

The suitability of this unit for range seeding is poor. Mechanical treatment is not practical because of the stones on the surface and the slope. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management. Because of the hazard of seepage, this unit is limited as a site for livestock watering ponds and other water impoundments.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. The Dahlquist soil is in the Loamy Slopes range site, and the Southace soil is in the Stony Foothills range site.

29—Dollard-Rock outcrop, shale complex, 12 to 25 percent slopes. This map unit is on ridges and mountainsides. Elevation is 6,800 to 8,500 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 80 to 90 days.

This unit is about 45 percent Dollard soil and 45 percent shale Rock outcrop.

Included in this unit are small areas of Pinelli soils on the slightly concave parts of the landscape. Included areas make up about 10 percent of the total acreage.

The Dollard soil is moderately deep and well drained. It formed in residuum derived dominantly from Mancos shale. Typically, the surface layer is grayish brown clay loam about 4 inches thick. The substratum is clay loam about 29 inches thick. It is underlain by weathered Mancos shale. The depth to weathered parent material ranges from 20 to 40 inches. The soil is calcareous throughout.

Permeability is slow in the Dollard soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is slight or moderate on the steeper slopes.

The Rock outcrop consists of slightly weathered, consolidated exposures of Mancos shale.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly bluebunch wheatgrass, Indian ricegrass, western wheatgrass, Saskatoon serviceberry, and mountain big sagebrush. Other plants that characterize this site are big bluegrass, bottlebrush squirreltail, mountain snowberry, lanceleaf rabbitbrush, and scattered Gambel oak. The average annual production of air-dry vegetation is about 400 pounds per acre. If the range condition deteriorates, mountain big sagebrush, cheatgrass, mustard, and other annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. The main limitations are the bedrock exposures and the slope.

This unit is severely limited as a site for all urban uses. Because of a high shrink-swell potential, the slow permeability, the depth to bedrock, the exposed bedrock, the hazard of erosion, and low strength, the unit should not be used for homesite development. The Dollard soil also is very highly susceptible to slumping and creeping as a result of an excessive load, overirrigation, or natural processes.

This map unit is in capability subclass VIe, nonirrigated. It is in the Mountain Shale range site.

30—Dollard-Rock outcrop, shale complex, 25 to 65 percent slopes. This map unit is on ridges, mountainsides, and valley sides. Elevation is 6,800 to 8,500 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 80 to 90 days.

This unit is about 45 percent Dollard soil and 45 percent shale Rock outcrop.

Included in this unit are small areas of Pinelli soils on the slightly concave parts of the landscape. Included areas make up about 10 percent of the total acreage.

The Dollard soil is moderately deep and well drained. It formed in residuum derived dominantly from Mancos shale. Typically, the surface layer is grayish brown clay loam about 4 inches thick. The substratum is clay loam about 29 inches thick. It is underlain by weathered Mancos shale. The depth to weathered parent material ranges from 20 to 40 inches. The soil is calcareous throughout.

Permeability is slow in the Dollard soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is severe.

The Rock outcrop consists of slightly weathered, consolidated exposures of Mancos shale.

This unit is used as rangeland or as wildlife habitat.

The potential plant community is mainly bluebunch wheatgrass, Indian ricegrass, western wheatgrass, Saskatoon serviceberry, and mountain big sagebrush. Other plants that characterize this site are big bluegrass, bottlebrush squirreltail, mountain snowberry, lanceleaf rabbitbrush, and scattered Gambel oak. The average annual production of air-dry vegetation is about 400 pounds per acre. If the range condition deteriorates, mountain big sagebrush, cheatgrass, mustard, and other annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. The main limitations are the bedrock exposures and the slope.

This unit is severely limited as a site for all urban uses. Because of a high shrink-swell potential, the slow permeability, the depth to bedrock, the exposed bedrock, the hazard of erosion, and low strength, the unit should not be used for homesite development. The Dollard soil also is very highly susceptible to slumping and creeping as a result of an excessive load, overirrigation, or natural processes.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Mountain Shale range site.

31—Dotsero gravelly sandy loam, 5 to 25 percent slopes. This deep, well drained soil is on mountains, terraces, side slopes, and benches. It formed in pumice, tuff, and basalt. Elevation is 7,200 to 7,800 feet. The average annual precipitation is 11 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 95 days.

Typically, the upper part of the surface layer is very dark grayish brown gravelly sandy loam about 7 inches thick. The lower part is dark grayish brown gravelly sandy loam about 24 inches thick. The upper 10 inches of the substratum is gravelly sandy loam. The lower part to a depth of 60 inches is fine sandy loam. The depth to carbonates ranges from 20 to 40 inches.

Included in this unit are small areas of Evanston and Forelle soils. Included areas make up about 10 percent of the total acreage.

Permeability is moderately rapid in the Dotsero soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate.

This unit is used for livestock grazing or as wildlife habitat. The potential plant community is mainly bluebunch wheatgrass, needleandthread, western wheatgrass, prairie junegrass, mountain big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are muttongrass, smooth horsebrush, and Saskatoon serviceberry. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Range seeding may be needed if the range is in poor condition. For successful seeding, a seedbed should be prepared and the seed drilled. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

If this unit is used for homesite development, the main limitation is the slope.

This map unit is in capability subclass VIe, nonirrigated. It is in the Deep Loam range site.

32—Dotsero sandy loam, 1 to 12 percent slopes. This deep, well drained soil is on terraces, side slopes, and benches. It formed in mixed alluvium derived dominantly from redbed sandstone and shale. The alluvium has a mantle of volcanic material. Elevation is 6,300 to 7,200 feet. The average annual precipitation is 11 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the upper part of the surface layer is very dark grayish brown sandy loam about 7 inches thick. The lower part is dark grayish brown gravelly sandy loam about 24 inches thick. The upper 10 inches of the substratum is gravelly sandy loam. The lower part to a depth of 60 inches is fine sandy loam. The soil is neutral and noncalcareous to a depth of 21 inches and moderately alkaline and calcareous below that depth.

Included in this unit are small areas of Forelle and Evanston soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderately rapid in the Dotsero soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate.

This unit is used mainly for irrigated crops or as hayland. It also is used for livestock grazing.

The potential plant community on this unit is mainly bluebunch wheatgrass, needleandthread, western wheatgrass, prairie junegrass, mountain big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are muttongrass, smooth horsebrush, and Saskatoon serviceberry. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If

the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

This unit responds well to applications of fertilizer, to range seeding, and to proper grazing use. Areas that are heavily infested with undesirable plants can be improved by chemical or mechanical treatment.

This unit is well suited to hay and pasture. A seedbed should be prepared on the contour or across the slope where practical. For successful seeding, a seedbed should be prepared and the seed drilled. Applications of nitrogen and phosphorus fertilizer improve the growth of forage plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion. Furrow, border, corrugation, and sprinkler irrigation systems are suited to this soil. Pipe, ditch lining, or drop structures in irrigation ditches facilitate irrigation and reduce the hazard of ditch erosion.

This unit is well suited to irrigated crops. If properly managed, it can produce 80 bushels of barley per acre annually.

This unit is well suited to homesite development.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Deep Loam range site.

33—Earsman-Rock outcrop complex, 12 to 65 percent slopes. This map unit is on mountainsides and ridges. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 80 to 105 days.

This unit is about 45 percent Earsman very stony sandy loam and 35 percent Rock outcrop. The Earsman soil is on the less steep slopes, and the areas of Rock outcrop are in the steeper convex areas throughout the unit.

Included in this unit are small areas of Arle and Ansari soils and soils that are similar to the Earsman soil but are deeper over bedrock. Included areas make up about 20 percent of the total acreage.

The Earsman soil is shallow and somewhat excessively drained. It formed in residuum and colluvium derived dominantly from calcareous redbed sandstone. About 5 to 10 percent of the surface is covered with flagstones, and 5 to 15 percent is covered with channery fragments. A thin layer of partially decomposed needles, twigs, and leaves is on the surface in many places. Typically, the surface layer is reddish brown very stony sandy loam about 5 inches thick. The substratum to a depth of 19 inches is very channery sandy loam. The depth to hard, calcareous sandstone ranges from 10 to 20 inches.

Permeability is moderately rapid in the Earsman soil. Available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is slight to severe on the steeper slopes.

This unit is used mainly as rangeland or as wildlife habitat. It also is used as a source of firewood and posts.

The potential plant community on this unit is mainly pinyon pine, Utah juniper, bluebunch wheatgrass, bottlebrush squirreltail, Indian ricegrass, and western wheatgrass. The potential production of the native understory vegetation in normal years is about 500 pounds of air-dry vegetation per acre.

The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. If the plant cover is disturbed, protection from flooding is needed to control gullying, streambank cutting, and sheet erosion.

This unit is suited to limited production of firewood. The average annual production is 5 cords per acre. The average stocking rate is 100 trees per acre. Special care is needed to minimize erosion when the stands are thinned and when other forest management practices are applied.

This unit is severely limited as a site for homesite development. Limitations include the shallow depth to bedrock, the exposed bedrock, the slope, the rapid runoff rate, and the very high hazard of water erosion.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Pinyon-Juniper woodland site.

34—Empedrado loam, 2 to 6 percent slopes. This deep, well drained soil is on fans and upland hills. It formed in alluvium and eolian material. Elevation is 6,500 to 9,000 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 75 to 95 days.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil is clay loam about 35 inches thick. The substratum to a depth of 60 inches or more is clay loam. The soil is noncalcareous to a depth of 38 inches and calcareous below that depth.

Included in this unit are small areas of soils that are similar to the Empedrado soil but have a darker, thicker surface layer. Also included are small areas of soils that are similar to the Empedrado soil but are silt loam or silty clay loam. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Empedrado soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as hayland or for crops. It is well suited to hay and pasture. Grasses and legumes grow well if adequate fertilizer is used. If properly managed, the unit can produce 5 tons of irrigated grass hay per acre annually.

The potential plant community on this unit is mainly western wheatgrass, needleandthread, prairie junegrass, mountain big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are muttongrass, Letterman needlegrass, common snowberry, Utah serviceberry, and antelope bitterbrush. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, Douglas rabbitbrush, and annual weeds increase in abundance.

This unit is well suited to alfalfa and small grain crops. It has few limitations. Maintaining crop residue on or near the surface helps to control runoff and soil blowing and helps to maintain tilth and the content of organic matter. If properly managed, the unit can produce 90 bushels of barley per acre annually.

This unit is suited to homesite development. The main limitations are the shrink-swell potential and the moderate permeability. The shrink-swell potential can be minimized by thoroughly prewetting foundation areas. The moderate permeability can be overcome by increasing the size of the absorption field.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Deep Loam range site.

35—Empedrado loam, 6 to 12 percent slopes. This deep, well drained soil is on fans and upland hills. It formed in alluvium and eolian material. Elevation is 6,500 to 9,000 feet. The average annual precipitation is about 15 to 18 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 75 to 95 days.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil is clay loam about 35 inches thick. The substratum to a depth of 60 inches is clay loam. The soil is noncalcareous to a depth of 38 inches and calcareous below that depth.

Included in this unit are small areas of soils that are similar to the Empedrado soil but have a darker, thicker surface layer. Also included are small areas of soils that are similar to the Empedrado soil but are silt loam or silty clay loam throughout. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Empedrado soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as hayland or for crops. It is well suited to hay and pasture. Grasses and legumes grow well if adequate fertilizer is used. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

This unit is well suited to alfalfa and small grain crops. It is limited mainly by the slope in some areas. Limiting tillage during seedbed preparation and controlling weeds help to control runoff and erosion. All tillage should be on the contour or across the slope. If properly managed, the unit can produce 75 bushels of barley per acre annually.

The potential plant community on this unit is mainly western wheatgrass, needleandthread, prairie junegrass, mountain big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are muttongrass, Letterman needlegrass, common snowberry, Utah serviceberry, and antelope bitterbrush. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, Douglas rabbitbrush, and annual weeds increase in abundance. These plants are dominant when the range is in poor condition; therefore, livestock grazing should be managed so that the desired balance of the preferred species is maintained.

This unit is suited to homesite development. The main limitations are the shrink-swell potential and the slope. The shrink-swell potential can be minimized by prewetting foundation areas. The slope is a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Deep Loam range site.

36—Empedrado loam, 12 to 25 percent slopes. This deep, well drained soil is on fans and upland hills. It formed in alluvium and eolian material. Elevation is 6,500 to 9,000 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 75 to 95 days.

Typically, the surface layer is brown loam about 5 inches thick. The subsoil is clay loam about 35 inches thick. The substratum to a depth of 60 inches or more is clay loam. The soil is noncalcareous to a depth of 38 inches and calcareous below that depth.

Included in this unit are small areas of soils that are similar to the Empedrado soil but are silt loam or silty clay loam. Also included are small areas of soils that are similar to the Empedrado soil but have a darker, thicker surface layer. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Empedrado soil.

Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or for homesite development.

If this unit is used for irrigated crops, the main limitation is the slope. If properly managed, the unit can produce 3.5 tons of irrigated grass hay per acre annually.

The potential plant community on this unit is mainly western wheatgrass, needleandthread, prairie junegrass, mountain big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are muttongrass, Letterman needlegrass, common snowberry, Utah serviceberry, and antelope bitterbrush. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, Douglas rabbitbrush, and annual weeds increase in abundance.

If this unit is used for homesite development, the main limitation is the slope.

This map unit is in capability subclass VIe, irrigated and nonirrigated. It is in the Deep Loam range site.

37—Etoe loam, 15 to 50 percent slopes. This deep, well drained soil is on mountainsides. It formed in alluvium and colluvium derived dominantly from sandstone. Elevation is 7,700 to 8,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 70 to 80 days.

Typically, the surface layer is pinkish gray loam about 8 inches thick. The subsurface layer is light brownish gray extremely cobbly sandy loam about 16 inches thick. The next layer is extremely cobbly sandy loam and extremely cobbly sandy clay loam about 11 inches thick. The subsoil is extremely stony sandy clay loam about 25 inches thick.

Included in this unit are small areas of Cochetopa and Ansel soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Etoe soil. Available water capacity is low. The effective rooting depth is more than 60 inches. Runoff is medium, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used for timber, limited grazing, or wildlife habitat. It is suited to the production of Douglas fir. Based on a site index of 72, the potential production per acre of merchantable timber is 5,800 cubic feet, or 24,000 board feet (International rule, ⅛-inch kerf) from an even-aged, fully stocked stand of trees 100 years old. Generally, only foot slopes and ridges are accessible. The slope limits harvesting in other areas.

The potential plant community on this unit is mainly Douglas fir with an understory of nodding brome, boxleaf myrtle, common juniper, mountain snowberry, and Saskatoon serviceberry. The potential production of the native understory vegetation in normal years is about 250 pounds of air-dry vegetation per acre.

The production of vegetation suitable for livestock grazing is limited by the overstory canopy. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

If this unit is used for homesite development, the main limitations are large stones and the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Douglas Fir woodland site.

38—Evanston loam, 1 to 6 percent slopes. This deep, well drained soil is on alluvial fans, terraces, and valley sides. It formed in alluvium derived dominantly from material of mixed mineralogy. Elevation is 6,500 to 8,000 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is brown loam about 14 inches thick. The subsoil is clay loam about 17 inches thick. The substratum to a depth of 60 inches or more is loam.

Included in this unit are small areas of Tridell, Uracca, and Forelle soils. Also included are small areas of soils that are similar to the Evanston soil but have more stones. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Evanston soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as rangeland. It also is used for pasture, crops, or wildlife habitat. A few areas also are used for homesite development.

The potential plant community on this unit is mainly bluebunch wheatgrass, western wheatgrass, muttongrass, Douglas rabbitbrush, and mountain big sagebrush. Utah serviceberry, mountain snowberry, prairie junegrass, and Ross sedge commonly are also included. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in

the potential plant community. This soil responds well to applications of fertilizer, to range seeding, and to proper grazing use. If the quality of range vegetation has seriously deteriorated, seeding is needed.

This unit is well suited to hay and pasture. It has few limitations. A seedbed should be prepared on the contour or across the slope where practical. Applications of nitrogen and phosphorus fertilizer improve growth of forage plants. If properly managed, the unit can produce 5 tons of irrigated grass hay per acre annually.

This unit is well suited to irrigated crops. If properly managed, it can produce 90 bushels of barley per acre annually.

This unit is suited to homesite development. The main limitation is the shrink-swell potential. The effects of shrinking and swelling can be minimized by prewetting foundation areas. Population growth has resulted in increased construction of homes in areas of this unit.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Deep Loam range site.

39—Evanston loam, 6 to 25 percent slopes. This deep, well drained soil is on alluvial fans, terraces, and valley sides. It formed in mixed alluvium. Elevation is 6,500 to 8,000 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is brown loam about 14 inches thick. The subsoil is clay loam about 17 inches thick. The substratum to a depth of 60 inches or more is loam.

Included in this unit are small areas of Tridell and Uracca soils. Also included are small areas of soils that are similar to the Evanston soil but have more stones. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Evanston soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland. It also is used as wildlife habitat. A few areas are used for homesite development.

The potential plant community on this unit is mainly bluebunch wheatgrass, western wheatgrass, muttongrass, Douglas rabbitbrush, and mountain big sagebrush. Utah serviceberry, mountain snowberry, prairie junegrass, and Ross sedge commonly are also included. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper range use, deferred grazing, rotation grazing, aerial spraying, and a planned grazing system. The suitability of this soil for range seeding is poor. The main limitation is the slope. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

This unit is suited to homesite development. The main limitations are the slope and the hazard of erosion. Preserving the existing plant cover during construction helps to control erosion. Topsoil can be stockpiled and used to reclaim areas disturbed during construction. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris.

This map unit is in capability subclass VIe, nonirrigated. It is in the Deep Loam range site.

40—Evanston loam, 25 to 45 percent slopes. This deep, well drained soil is on alluvial fans, terraces, and valley sides. It formed in mixed alluvium. Elevation is 6,500 to 8,000 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is brown loam about 12 inches thick. The subsoil is clay loam about 13 inches thick. The substratum to a depth of 60 inches or more is loam.

Included in this unit are small areas of Tridell soils. Also included are areas of Evanston soils that have slopes of less than 25 percent. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in this Evanston soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used mainly as rangeland. It also is used as wildlife habitat.

The potential plant community on this unit is mainly bluebunch wheatgrass, western wheatgrass, muttongrass, Douglas rabbitbrush, and mountain big sagebrush. Utah serviceberry, mountain snowberry, prairie junegrass, and Ross sedge commonly are also included. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. The suitability of this soil for range seeding is poor. The main limitation is the slope. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Deep Loam range site.

41—Evanston loam, 45 to 65 percent slopes. This deep, well drained soil is on alluvial fans, terraces, and valley sides. It formed in mixed alluvium. Elevation is 6,500 to 8,000 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is brown loam about 12 inches thick. The subsoil is clay loam about 13 inches thick. The substratum to a depth of 60 inches or more is loam.

Included in this unit are small areas of Tridell soils, areas of Evanston soils that have slopes of less than 45 percent, and small areas of Rock outcrop. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in this Evanston soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used mainly as rangeland. It also is used as wildlife habitat.

The potential plant community on this unit is mainly bluebunch wheatgrass, western wheatgrass, muttongrass, Douglas rabbitbrush, and mountain big sagebrush. Utah serviceberry, mountain snowberry, prairie junegrass, and Ross sedge commonly are also included. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. The suitability of this soil for range seeding is poor. The main limitation is the slope. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Deep Loam range site.

42—Fluvaquents, 0 to 10 percent slopes. This broadly defined unit consists of deep, somewhat poorly drained, nearly level soils on flood plains and alluvial valley floors. These soils formed in alluvium.

Fluvaquents are stratified and vary widely in texture and in depth to sand, gravel, and cobbles. Typically, the surface layer ranges from loamy sand to fine sandy loam or from silt loam to clay loam. The underlying layers are generally sandy loam or loam stratified with sand, gravel, and cobbles. In some areas gravel and cobbles are on or near the surface.

The water table fluctuates between depths of 0.5 foot and 2.0 feet during spring and summer. These soils are occasionally flooded for brief periods in late spring and early summer.

Included in this unit are small, isolated areas of Redrob soils. Also included are small, isolated areas where water stands at or near the surface all year. These water areas are identified by a special symbol on the soil maps. Included areas make up about 15 percent of the total acreage.

These soils are used for wildlife habitat, recreational development, or grazing. The native vegetation is mainly cottonwood, willow, water-tolerant grasses, sedges, and rushes. Mule deer, cottontail rabbit, coyote, and bobcat and ducks, geese, and other native birds find food and shelter on these soils. Where feasible, planting small grain, trees, and shrubs improves the habitat for upland wildlife.

This unit is poorly suited to homesite development. The main limitations are the flooding and the seasonal high water table.

This map unit is in capability subclass VIw, nonirrigated. It generally is in the Riverbottom range site. At the higher elevations, however, it is in the Mountain Meadow range site.

43—Forelle-Brownsto complex, 6 to 12 percent slopes. This map unit is on mountains and benches. Elevation is 6,500 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 105 days.

This unit is about 55 percent Forelle soil and 30 percent Brownsto soil.

Included in this unit are small areas of Tridell soils on knolls, Mussel and Morval soils in swales, and basalt Rock outcrop. Also included are small areas of soils that are similar to the Forelle and Brownsto soils but have soft bedrock below a depth of 40 inches. Included areas make up about 15 percent of the total acreage.

The Forelle soil is deep and well drained. It formed in mixed alluvium derived dominantly from sedimentary

rocks. Typically, the surface layer is brown loam about 6 inches thick. The subsoil is clay loam about 24 inches thick. The substratum to a depth of 60 inches is loam.

Permeability is moderate in the Forelle soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium. The hazard of water erosion generally is moderate, but it is severe in areas that contain volcanic ash.

The Brownsto soil is deep and well drained. It formed in alluvium derived dominantly from coarse textured, calcareous sandstone and basalt. Typically, the upper part of the surface layer is light brownish gray gravelly sandy loam about 4 inches thick. The lower part is light brownish gray gravelly loam about 7 inches thick. The upper 19 inches of the substratum is very gravelly sandy loam. The next 12 inches is very gravelly loamy sand. The lower part to a depth of 60 inches is gravelly sandy loam. A thin layer of partially decomposed needles, twigs, and leaves is on the surface in many places.

Permeability is moderate in the Brownsto soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat.

The potential plant community on the Forelle soil is mainly western wheatgrass, bluebunch wheatgrass, Indian ricegrass, Douglas rabbitbrush, and Wyoming big sagebrush. Muttongrass, streambank wheatgrass, and winterfat commonly are also included. The average annual production of air-dry vegetation is about 800 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

The potential plant community on the Brownsto soil is mainly needleandthread, Indian ricegrass, western wheatgrass, and Wyoming big sagebrush. Bluebunch wheatgrass, bottlebrush squirreltail, and scattered Utah juniper and pinyon pine also are included. The average annual production of air-dry vegetation is about 600 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. If the quality of range vegetation has seriously deteriorated, seeding is needed. The suitability of this unit for range seeding is good in areas of the Forelle soil and poor in areas of the Brownsto soil. The main limitation is the cobbles and stones on the Brownsto soil. For successful seeding, a seedbed should be prepared and the seed drilled. In areas of the Forelle soil, brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

This unit is suited to homesite development. The main limitations are the slope in the steeper areas and small stones in the Brownsto soil.

This map unit is in capability subclass IVe, nonirrigated. The Forelle soil is in the Rolling Loam range site, and the Brownsto soil is in the Stony Foothills range site.

44—Forelle-Brownsto complex, 12 to 25 percent slopes. This map unit is on mountain side slopes. Elevation is 6,500 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 105 days.

This unit is about 50 percent Forelle soil and 35 percent Brownsto soil.

Included in this unit are small areas of Tridell soils and basalt Rock outcrop on knolls. Also included are small areas of Mussel and Morval soils in the more gently sloping areas. Included areas make up about 15 percent of the total acreage.

The Forelle soil is deep and well drained. It formed in mixed alluvium derived dominantly from sedimentary rocks. Typically, the surface layer is brown loam about 6 inches thick. The subsoil is clay loam about 24 inches thick. The substratum to a depth of 60 inches is loam.

Permeability is moderate in the Forelle soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid. The hazard of water erosion generally is moderate, but it is severe in areas that contain volcanic ash.

The Brownsto soil is deep and well drained. It formed in alluvium derived dominantly from coarse textured, calcareous sandstone and basalt. Typically, the upper part of the surface layer is light brownish gray gravelly sandy loam about 4 inches thick. The lower part is light brownish gray gravelly loam about 7 inches thick. The upper 19 inches of the substratum is very gravelly sandy loam. The next 12 inches is very gravelly loamy sand. The lower part to a depth of 60 inches is gravelly sandy loam. A thin layer of partially decomposed needles, twigs, and leaves is on the surface in many places.

Permeability is moderate in the Brownsto soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat.

The potential plant community on the Forelle soil is mainly western wheatgrass, bluebunch wheatgrass, Indian ricegrass, Douglas rabbitbrush, and Wyoming big

sagebrush. Muttongrass, streambank wheatgrass, and winterfat also are included. The average annual production of air-dry vegetation is about 800 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, and cheatgrass increase in abundance.

The potential plant community on the Brownsto soil is mainly needleandthread, Indian ricegrass, western wheatgrass, and Wyoming big sagebrush. Bluebunch wheatgrass, bottlebrush squirreltail, and scattered Utah juniper and pinyon pine also are included. The average annual production of air-dry vegetation is about 600 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. If the quality of range vegetation has seriously deteriorated, seeding is needed. The main limitation is stoniness in areas of the Brownsto soil. For successful seeding, a seedbed should be prepared and the seed drilled. In areas of the Forelle soil, brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

If this unit is used for homesite development, the main limitation is the slope.

This map unit is in capability subclass VIe, nonirrigated. The Forelle soil is in the Rolling Loam range site, and the Brownsto soil is in the Stony Foothills range site.

45—Forsey cobbly loam, 3 to 12 percent slopes. This deep, well drained soil is on alluvial fans, mountainsides, and ridges. It formed in alluvium, colluvium, and residuum derived from material of mixed mineralogy. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 17 to 19 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 75 to 85 days.

About 25 to 30 percent of the surface is covered with cobbles (fig. 4). Typically, the surface layer is dark grayish brown cobbly loam about 10 inches thick. The subsoil is very cobbly clay loam about 12 inches thick. The substratum to a depth of 60 inches is very cobbly sandy clay loam. The soil is noncalcareous and mildly alkaline to a depth of 22 inches and calcareous and moderately alkaline below that depth.

Included in this unit are small areas of Rock outcrop. Included areas make up about 5 percent of the total acreage.

Permeability is moderate in the Forsey soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as rangeland or for pasture. The potential plant community is mainly bluebunch wheatgrass, muttongrass, prairie junegrass, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are Columbia needlegrass, needleandthread, mountain snowberry, and antelope bitterbrush. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, cheatgrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. The main limitation is the surface stoniness.

Controlled flooding is the best method of irrigation on this soil because of the stony surface. In order to avoid overirrigating and prevent the leaching of plant nutrients, applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop.

This unit is suited to homesite development. Because of the stones, however, excavating is difficult.

This map unit is in capability subclass VIe, irrigated and nonirrigated. It is in the Stony Loam range site.

46—Forsey cobbly loam, 12 to 25 percent slopes. This deep, well drained soil is on alluvial fans, mountainsides, and ridges. It formed in alluvium, colluvium, and residuum derived from material of mixed mineralogy. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 17 to 19 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 75 to 85 days.

About 25 to 30 percent of the surface is covered with cobbles. Typically, the surface layer is dark grayish brown cobbly loam about 10 inches thick. The subsoil is very cobbly clay loam about 12 inches thick. The substratum to a depth of 60 inches is very cobbly sandy clay loam. The soil is noncalcareous and mildly alkaline to a depth of 22 inches and calcareous and moderately alkaline below that depth.

Included in this unit are small areas of sandstone outcrops. Included areas make up about 5 percent of the total acreage.

Permeability is moderate in the Forsey soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland. The potential plant community is mainly bluebunch wheatgrass, muttongrass, prairie junegrass, mountain big sagebrush,

Figure 4.—An area of Forsey cobbly loam, 3 to 12 percent slopes, in the foreground. Forelle-Brownsto complex, 12 to 25 percent slopes, is on the slope in the background, and basalt Rock outcrop is on the ridge crest.

and Saskatoon serviceberry. Other plants that characterize this site are Columbia needlegrass, mountain snowberry, and antelope bitterbrush. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, cheatgrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. Mechanical treatment is not practical because of the stones on the surface.

If this unit is used for homesite development, the main limitation is the slope.

This map unit is in capability subclass VIe, nonirrigated. It is in the Stony Loam range site.

47—Forsey cobbly loam, 25 to 65 percent slopes. This deep, well drained soil is on alluvial fans, mountainsides, and ridges. It formed in alluvium, colluvium, and residuum derived from material of mixed mineralogy. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 17 to 19 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 75 to 85 days.

About 25 to 30 percent of the surface is covered with cobbles. Typically, the surface layer is dark grayish brown cobbly loam about 10 inches thick. The subsoil is very cobbly clay loam about 12 inches thick. The substratum to a depth of 60 inches is very cobbly sandy clay loam. The soil is noncalcareous and mildly alkaline to a depth of 22 inches and calcareous and moderately alkaline below that depth.

Included in this unit are small areas of sandstone outcrops. Included areas make up about 5 percent of the total acreage.

Permeability is moderate in the Forsey soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly bluebunch wheatgrass, muttongrass, prairie junegrass, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are Columbia needlegrass, mountain snowberry, and antelope bitterbrush. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, cheatgrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. Mechanical treatment is not practical because of the stones on the surface and the slope. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Stony Loam range site.

48—Fughes stony loam, 3 to 12 percent slopes. This deep, well drained soil is on foot slopes. It formed in alluvium and colluvium derived dominantly from noncalcareous shale. Elevation is 6,500 to 8,500 feet. The average annual precipitation is 14 to 17 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 80 to 100 days.

Typically, the surface layer is brown stony loam about 6 inches thick. The next layer is brown clay loam about 10 inches thick. The upper 8 inches of the subsoil is dark reddish brown clay. The lower 26 inches is reddish brown clay. The substratum to a depth of 60 inches or more is clay loam.

Included in this unit are small areas of soils that are similar to the Fughes soil but have 5 to 20 percent cobbles in the profile and soils that are similar to the Fughes soil but have mottles below a depth of 50 inches. Included areas make up about 10 percent of the total acreage.

Permeability is slow in the Fughes soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as hayland or rangeland. It can be used for irrigated crops if water is made available. It is well suited to hay and pasture. If the unit is used for irrigated hay, the main limitation is the slope in some areas. Grasses and legumes grow well if adequate fertilizer is used. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

If this unit is used for irrigated crops, the main limitations are the stoniness and the slope in some areas. If properly managed, the unit can produce 80 bushels of barley per acre annually.

The potential plant community on this unit is mainly Idaho fescue, slender wheatgrass, and mountain big sagebrush. Other plants that characterize this site are big bluegrass, Saskatoon serviceberry, and mountain snowberry. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, Kentucky bluegrass, and annual weeds increase in abundance.

The suitability of this soil for range seeding is good. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

If this unit is used for homesite development, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content around the foundation. Backfilling excavations with material that has a low shrink-swell potential can also reduce the effects of shrinking and swelling. Septic tank absorption fields of conventional size do not function adequately because of the slow permeability. Other kinds of sewage disposal systems may be needed.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Mountain Loam range site.

49—Goslin fine sandy loam, 3 to 6 percent slopes. This deep, well drained soil is on toe slopes, fans, and terraces. It formed in colluvium and alluvium derived dominantly from redbed sandstone and shale. Elevation is 6,200 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is reddish brown fine sandy loam about 5 inches thick. The substratum to a depth of 60 inches is fine sandy loam. The soil is calcareous throughout.

Included in this unit are small areas of Almy soils and Goslin soils that have steeper slopes than those on this Goslin soil. Also included are small areas of soils that are similar to this Goslin soil but have a stony surface layer. Included areas make up about 15 percent of the total acreage.

Permeability is moderately rapid in this Goslin soil. Available water capacity is moderate. The effective

rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight or moderate. During brief and intense storms, runoff from adjacent uplands may cause gully erosion.

This unit is used mainly for livestock grazing, hay, or pasture. It also is used for irrigated hay or pasture.

The potential plant community on this unit is mainly western wheatgrass, Indian ricegrass, bottlebrush squirreltail, winterfat, and big sagebrush. Bluebunch wheatgrass, needleandthread, and Douglas rabbitbrush also are included. The average annual production of air-dry vegetation is about 800 pounds per acre. If the range condition deteriorates, big sagebrush, rubber rabbitbrush, and cheatgrass increase in abundance. Suitable management practices include proper grazing use and a planned grazing system.

If the quality of range vegetation has seriously deteriorated, seeding is needed. For successful seeding, a seedbed should be prepared and the seed drilled. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

If this unit is used for irrigated hay or pasture crops, the main limitation is the hazard of erosion. Furrow, border, corrugation, and sprinkler irrigation systems are suited to this unit. Crop residue left on or near the surface conserves moisture and helps to maintain tilth and control erosion. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage. If properly managed, the unit can produce 3.5 tons of irrigated grass hay per acre annually.

This unit is well suited to homesite development. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris. Structures that divert runoff are needed if buildings and roads are constructed.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Rolling Loam range site.

50—Goslin fine sandy loam, 6 to 25 percent slopes. This deep, well drained soil is on toe slopes, fans, and terraces. It formed in alluvium and colluvium derived dominantly from redbed sandstone and shale. Elevation is 6,200 to 7,500 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is reddish brown fine sandy loam about 5 inches thick. The substratum to a depth of 60 inches is fine sandy loam. The soil is calcareous throughout.

Included in this unit are small areas of Almy soils, soils that are similar to the Goslin soil but are stratified, and soils that are similar to the Goslin soil but have a stony surface layer. Included areas make up about 15 percent of the total acreage.

Permeability is moderately rapid in the Goslin soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used for livestock grazing or hay and pasture. It is also used for urban development.

The potential plant community on this unit is mainly western wheatgrass, Indian ricegrass, bottlebrush squirreltail, big sagebrush, and winterfat. Bluebunch wheatgrass, needleandthread, and Douglas rabbitbrush also are included. The average annual production of air-dry vegetation is about 800 pounds per acre. If the range condition deteriorates, big sagebrush, rubber rabbitbrush, and cheatgrass increase in abundance.

This unit responds well to range seeding and to proper grazing use. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase. Because of the hazard of seepage, this unit is limited as a site for livestock watering ponds and other water impoundments.

This unit is suited to irrigated hay and pasture. The main limitations are the slope and the hazard of erosion. A seedbed should be prepared on the contour or across the slope where practical. Limiting tillage for seedbed preparation and controlling weeds help to control runoff and erosion. Sprinkler irrigation helps to establish the seedlings. If properly managed, the unit can produce 3 tons of irrigated grass hay per acre annually.

If this unit is used for homesites or urban development, the main limitation is the slope in the steeper areas. The slope is also a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and help stabilize cut slopes.

This map unit is in capability subclass VIe, irrigated and nonirrigated. It is in the Rolling Loam range site.

51—Gothic loam, 1 to 6 percent slopes. This deep, well drained soil is on valley fill side slopes and on alluvial fans. It formed in alluvium derived dominantly from glacial till. Elevation is 8,200 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 60 to 80 days.

Typically, the surface layer is dark brown loam about 12 inches thick. The subsoil is clay about 22 inches thick. The substratum to a depth of 60 inches or more is gravelly clay loam.

Included in this unit are small areas of Dollard, Anvik, Skylick, Sligting, Jerry, and Kilgore soils. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Gothic soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight or moderate on the steeper slopes.

This unit is used as rangeland, hayland, or pasture. It is well suited to hay and pasture. Important management concerns in areas of irrigated hay and pasture are the slow permeability and a short growing season. If properly managed, the unit can produce 3.5 tons of irrigated grass hay per acre annually. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion.

The potential plant community on this unit is mainly Gambel oak, Saskatoon serviceberry, common chokecherry, and slender wheatgrass. Other plants that characterize this site are Letterman needlegrass, elk sedge, mountain snowberry, and big bluegrass. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, Gambel oak, mountain snowberry, Kentucky bluegrass, and annual weeds increase in abundance. Range seeding may be needed if the range is in poor condition.

If this unit is used for homesite development, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content around the foundation. Backfilling excavations with material that has a low shrink-swell potential can also reduce the effects of shrinking and swelling.

This map unit is in capability subclass VIe, irrigated and nonirrigated. It is in the Brushy Loam range site.

52—Gothic loam, 6 to 25 percent slopes. This deep, well drained soil is on valley fill side slopes and on alluvial fans. It formed in alluvium derived dominantly from glacial till. Elevation is 8,200 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 60 to 80 days.

Typically, the surface layer is dark brown loam about 12 inches thick. The subsoil is clay about 22 inches thick. The substratum to a depth of 60 inches is gravelly clay loam.

Included in this unit are small areas of Dollard, Anvik, Skylick, Sligting, Jerry, and Kilgore soils. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Gothic soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used as rangeland, hayland, or pasture. It is well suited to hay and pasture. Important management concerns in areas of irrigated hay and pasture are the slow permeability and a short growing season. If properly managed, the unit can produce 3.5 tons of irrigated grass hay per acre annually. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion.

The potential plant community on this unit is mainly Gambel oak, Saskatoon serviceberry, common chokecherry, and slender wheatgrass. Other plants that characterize this site are Letterman needlegrass, elk sedge, mountain snowberry, and big bluegrass. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, Gambel oak, mountain snowberry, Kentucky bluegrass, and annual weeds increase in abundance. Range seeding is suitable if the range is in poor condition.

If this unit is used for homesite development, the main limitation is the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content around the foundation. Backfilling excavations with material that has a low shrink-swell potential can also reduce the effects of shrinking and swelling.

This map unit is in capability subclass VIe, irrigated and nonirrigated. It is in the Brushy Loam range site.

53—Gothic loam, 25 to 65 percent slopes. This deep, well drained soil is on valley fill side slopes and on alluvial fans. It formed in alluvium derived dominantly from glacial till. Elevation is 8,200 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 60 to 80 days.

Typically, the surface layer is dark brown loam about 12 inches thick. The subsoil is clay about 22 inches thick. The substratum to a depth of 60 inches is gravelly clay loam.

Included in this unit are small areas of Dollard, Anvik, Skylick, Sligting, Jerry, and Kilgore soils. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Gothic soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used as rangeland. The potential plant community is mainly Gambel oak, Saskatoon serviceberry, common chokecherry, and slender

wheatgrass. Other plants that characterize this site are Letterman needlegrass, elk sedge, mountain snowberry, and big bluegrass. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, Gambel oak, mountain snowberry, Kentucky bluegrass, and annual weeds increase in abundance. Range seeding may be needed if the range is in poor condition.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential and the slope. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content around the foundation. Backfilling excavations with material that has a low shrink-swell potential can also reduce the effects of shrinking and swelling.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Brushy Loam range site.

54—Grotte gravelly loam, 25 to 65 percent slopes. This deep, well drained soil is on mountainsides. It formed in alluvium and colluvium derived dominantly from sandstone. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 15 to 17 inches, the average annual air temperature is 35 to 38 degrees F, and the average frost-free period is 80 to 105 days.

Typically, the surface layer is grayish brown gravelly loam about 4 inches thick. The next layer is gravelly clay loam about 3 inches thick. The substratum to a depth of 60 inches or more is very channery clay loam. The soil is calcareous throughout.

Included in this unit are small areas of Dahlquist and Southace soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the Grotte soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe on the steeper slopes.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly Indian ricegrass, bluebunch wheatgrass, bottlebrush squirreltail, true mountainmahogany, Wyoming big sagebrush, and Utah serviceberry. Other plants that characterize this site are Douglas rabbitbrush, needleandthread, prairie junegrass, pinyon pine, and Utah juniper. The average annual production of air-dry vegetation is about 600 pounds per acre. If the range condition deteriorates, Douglas rabbitbrush, Wyoming big sagebrush, cheatgrass, and annual weeds increase in abundance. Loss of the surface layer severely reduces the ability of the unit to produce plants suitable for grazing.

This unit is poorly suited to homesite development. The main limitation is the slope. Slumping is common in sloping areas.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Stony Foothills range site.

55—Gypsum land-Gypsiorthids complex, 12 to 65 percent slopes. This map unit is on mountainsides, on hills, and along dissected drainageways (fig. 5). It is on hills and canyon side slopes throughout the survey area.

This unit is about 65 percent Gypsum land and 20 percent Gypsiorthids.

Included in this unit are small areas of Torriorthents and Camborthids. Included areas make up about 15 percent of the total acreage.

The Gypsum land consists mainly of exposed parent material that has a very high content of gypsum.

The Gypsiorthids are shallow and moderately deep and well drained. They formed in residuum and colluvium derived dominantly from mixed material with a very high content of gypsum. Slope is 12 to 50 percent. No single profile of these soils is typical, but one commonly observed in the survey area has a surface layer of very pale brown fine sandy loam about 8 inches thick. The substratum is fine sandy loam. Soft, gypsiferous shale is at a depth of about 39 inches.

Permeability is moderate in the Gypsiorthids. Available water capacity is low or moderate. The effective rooting depth is 10 to 40 inches. Runoff is very rapid, and the hazard of water erosion is slight to severe on the steeper slopes.

This unit is used as wildlife habitat. The native vegetation on the Gypsiorthids is sparse grasses, forbs, and Utah juniper. The Gypsum land supports very little native vegetation.

This unit is poorly suited to homesite development. The main limitations are the slope, the hazard of erosion, piping, and low soil strength during wet periods.

This map unit is in capability class VIII. No range site is assigned.

56—Ipson cobbly loam, 3 to 25 percent slopes. This deep, well drained soil is on terraces, terrace side slopes, and fans. It formed in alluvium and outwash derived dominantly from sandstone and basalt. Elevation is 6,700 to 8,300 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 70 to 90 days.

About 10 to 20 percent of the surface is covered with cobbles. Typically, the surface layer is brown cobbly loam about 14 inches thick. The upper 12 inches of the

Figure 5.—An area of Gypsum land-Gypsiorthids complex, 12 to 65 percent slopes, in the foreground. The nearly barren escarpments in the distance are areas of Torriorthents-Rock outcrop complex, 45 to 95 percent slopes.

subsoil is brown very gravelly sandy clay loam. The next 9 inches is brown very gravelly sandy clay loam. The lower 7 inches is light brown gravelly sandy clay loam. The upper 12 inches of the substratum is light brown very gravelly sandy clay loam. The lower part to a depth of 60 inches is light brown gravelly sandy clay loam. The soil is noncalcareous to a depth of 26 inches and calcareous below that depth.

Included in this unit are small areas of soils that are similar to the Ipson soil but have more stones in the profile and soils that are similar to the Ipson soil but have a less well developed subsoil. Also included are small areas of Evanston soils. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Ipson soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or for homesite development. The potential plant community is mainly bluebunch wheatgrass, muttongrass, western wheatgrass, true mountainmahogany, and big sagebrush. Prairie junegrass, mountain snowberry, and scattered pinyon pine and Gambel oak also are included. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

If this unit is used for range seeding or if mechanical treatment is applied, the main limitation is the cobbles on the surface. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management.

Population growth has resulted in increased construction of homes in areas of this unit. The main limitations are the large stones in the profile and the slope in the steeper areas. Topsoil can be stockpiled and used to reclaim areas disturbed during

construction. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns.

This map unit is in capability subclass VIe, nonirrigated. It is in the Loamy Slopes range site.

57—Ipson cobbly loam, 25 to 50 percent slopes. This deep, well drained soil is on terrace side slopes and fans. It formed in alluvium and outwash derived dominantly from sandstone and basalt. Elevation is 6,700 to 8,300 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 70 to 90 days.

About 15 to 20 percent of the surface is covered with cobbles. Typically, the surface layer is brown cobbly loam about 14 inches thick. The upper 12 inches of the subsoil is brown very gravelly sandy clay loam. The next 9 inches is brown very gravelly sandy clay loam. The lower 7 inches is light brown gravelly sandy clay loam. The upper 12 inches of the substratum is light brown very gravelly sandy clay loam. The lower part to a depth of 60 inches is light brown gravelly sandy clay loam. The soil is noncalcareous to a depth of 26 inches and calcareous below that depth.

Included in this unit are small areas of soils that are similar to the Ipson soil but have more stones in the profile and soils that are similar to the Ipson soil but have a less well developed subsoil. Also included are small areas of Evanston soils. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Ipson soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland. The potential plant community is mainly bluebunch wheatgrass, muttongrass, western wheatgrass, true mountainmahogany, and big sagebrush. Prairie junegrass, mountain snowberry, and scattered pinyon pine and Gambel oak also are included. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management. Mechanical treatment is not practical because of the cobbly surface and the slope. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

If this unit is used for homesite development, the main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Loamy Slopes range site.

58—Irrawaddy very stony loam, 25 to 65 percent slopes. This moderately deep, well drained soil is on mountainsides. It formed in colluvium and residuum derived dominantly from limestone. Elevation is 8,200 to 8,600 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 36 to 42 degrees F, and the average frost-free period is 60 to 75 days.

Typically, the upper part of the surface layer is very dark grayish brown very stony loam about 5 inches thick. The lower part is very channery loam about 9 inches thick. The substratum is very channery loam. Hard, dolomitic limestone bedrock is at a depth of about 34 inches. The depth to bedrock ranges from 20 to 40 inches. The soil is calcareous throughout.

Included in this unit are small areas of Jerry, Forsey, Leavittville, Cushool, and Rentsac soils. Included areas make up about 10 percent of the total acreage.

Permeability is moderate in the Irrawaddy soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly for grazing. It also is used as wildlife habitat.

The potential plant community on this unit is mainly elk sedge, big bluegrass, Gambel oak, mountain snowberry, and mountain brome. Other plants that characterize this site are Columbia needlegrass, slender wheatgrass, common chokecherry, and Saskatoon serviceberry. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, Gambel oak, Kentucky bluegrass, elk sedge, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. Mechanical treatment is not practical because of the stony surface and the slope.

This unit is poorly suited to homesite development. The main limitations are the slope and the large stones.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Brushy Loam range site.

59—Iyers loam, 6 to 25 percent slopes. This moderately deep, well drained soil is on hills, ridges, and mountainsides. It formed in residuum and colluvium derived dominantly from calcareous shale. Elevation is 8,000 to 10,000 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 37 to 39 degrees F, and the average frost-free period is 50 to 70 days.

Typically, the surface layer is grayish brown loam

about 3 inches thick. The next layer is clay about 9 inches thick. The substratum is clay about 25 inches thick over shale. The depth to calcareous shale ranges from 20 to 40 inches. The soil is calcareous throughout.

Included in this unit are small areas of Forsey, Cochetopa, Antrobus, Anvik, Skylick, and Sligting soils. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Iyers soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight to severe on the steeper slopes.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly Thurber fescue, Idaho fescue, and needlegrasses. Other plants that characterize this site are slender wheatgrass, nodding brome, and silver sagebrush. The average annual production of air-dry vegetation is about 2,500 pounds per acre. If the range condition deteriorates, silver sagebrush and Kentucky bluegrass increase in abundance. Range seeding may be needed if the range is in poor condition.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential and the slope in the steeper areas.

This map unit is in capability subclass VIe. It is in the Subalpine Loam range site.

60—Iyers loam, 25 to 65 percent slopes. This moderately deep, well drained soil is on hills, ridges, and mountainsides. It formed in residuum and colluvium derived dominantly from calcareous shale. Elevation is 8,000 to 10,000 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 37 to 39 degrees F, and the average frost-free period is 50 to 70 days.

Typically, the surface layer is grayish brown loam about 3 inches thick. The next layer is clay about 9 inches thick. The substratum is clay about 25 inches thick over shale. The depth to calcareous shale ranges from 20 to 40 inches. The soil is calcareous throughout.

Included in this unit are small areas of Forsey, Cochetopa, Antrobus, Anvik, Skylick, and Sligting soils. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Iyers soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is severe on the steeper slopes.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly Thurber fescue, Idaho fescue, and needlegrasses. Other plants that characterize this site are slender wheatgrass, nodding brome, and silver sagebrush. The average annual production of air-dry vegetation is about 2,500 pounds per acre. If the range condition deteriorates, silver sagebrush and Kentucky bluegrass increase in abundance. Range seeding may be needed if the range is in poor condition.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential and the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Subalpine Loam range site.

61—Iyers silty clay loam, 6 to 25 percent slopes. This moderately deep, well drained soil is on hills, ridges, and mountainsides. It formed in residuum and colluvium derived dominantly from calcareous shale. Elevation is 8,000 to 10,000 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 37 to 39 degrees F, and the average frost-free period is 50 to 70 days.

Typically, the surface layer is light brownish gray silty clay loam about 6 inches thick. The next layer is clay about 9 inches thick. The substratum is clay about 18 inches thick over shale. The depth to calcareous shale ranges from 20 to 40 inches. The soil is calcareous throughout.

Included in this unit are small areas of Forsey, Cochetopa, Antrobus, Anvik, Skylick, and Sligting soils. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Iyers soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight to severe on the steeper slopes.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly Thurber fescue, Idaho fescue, and needlegrasses. Other plants that characterize this site are slender wheatgrass, nodding brome, and silver sagebrush. The average annual production of air-dry vegetation is about 2,500 pounds per acre. If the range condition deteriorates, silver sagebrush and Kentucky bluegrass increase in abundance. Range seeding may be needed if the range is in poor condition.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential and the slope in the steeper areas.

This map unit is in capability subclass VIe, nonirrigated. It is in the Subalpine Loam range site.

62—Iyers silty clay loam, 25 to 65 percent slopes. This moderately deep, well drained soil is on hills, ridges, and mountainsides. It formed in colluvium derived dominantly from calcareous shale. Elevation is 8,000 to 10,000 feet. The average annual precipitation

is 18 to 20 inches, the average annual air temperature is 37 to 39 degrees F, and the average frost-free period is 50 to 70 days.

Typically, the surface layer is light brownish gray silty clay loam about 6 inches thick. The next layer is clay about 9 inches thick. The substratum is clay about 18 inches thick over shale. The depth to calcareous shale ranges from 20 to 40 inches. The soil is calcareous throughout.

Included in this unit are small areas of Forsey, Cochetopa, Antrobus, Anvik, Skylick, and Sligting soils. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Iyers soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate to severe on the steeper slopes.

This unit is used as rangeland, watershed, or wildlife habitat. The potential plant community is mainly Thurber fescue, Idaho fescue, and needlegrasses. Other plants that characterize this site are slender wheatgrass, nodding brome, and silver sagebrush. The average annual production of air-dry vegetation is about 2,500 pounds per acre. If the range condition deteriorates, silver sagebrush and Kentucky bluegrass increase in abundance.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential and the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Subalpine Loam range site.

63—Jerry loam, 12 to 25 percent slopes. This deep, well drained soil is on alluvial fans and hills. It formed in alluvium derived dominantly from sandstone and shale. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 37 to 40 degrees F, and the average frost-free period is 70 to 80 days.

Typically, the surface layer is dark grayish brown loam about 11 inches thick. The subsoil is channery clay loam about 23 inches thick. The substratum to a depth of 60 inches is very channery clay loam.

Included in this unit are small areas of Showalter, Morval, Cochetopa, Tridell, and Fughes soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Jerry soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland. The potential plant community is mainly mountain brome, elk sedge, mountain snowberry, Gambel oak, and Saskatoon serviceberry. Other plants that characterize this site are slender wheatgrass, needlegrasses, and western wheatgrass. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, rabbitbrush, Kentucky bluegrass, Canada thistle, and downy bromegrass increase in abundance.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential and the slope.

This map unit is in capability subclass VIe, nonirrigated. It is in the Brushy Loam range site.

64—Jerry loam, 25 to 65 percent slopes. This deep, well drained soil is on alluvial fans and hills. It formed in alluvium derived dominantly from sandstone and shale. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 37 to 40 degrees F, and the average frost-free period is 70 to 80 days.

Typically, the surface layer is dark grayish brown loam about 11 inches thick. The subsoil is channery clay loam about 23 inches thick. The substratum to a depth of 60 inches is very channery clay loam.

Included in this unit are small areas of Showalter, Morval, Cochetopa, Tridell, and Fughes soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Jerry soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland. The potential plant community is mainly mountain brome, elk sedge, mountain snowberry, Gambel oak, and Saskatoon serviceberry. Other plants that characterize this site are slender wheatgrass, needlegrass, and western wheatgrass. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, rabbitbrush, Kentucky bluegrass, Canada thistle, and downy bromegrass increase in abundance.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential and the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Brushy Loam range site.

65—Jerry-Millerlake loams, 1 to 6 percent slopes. This map unit is on alluvial fans and valley side slopes. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 37 to 40 degrees F, and the average frost-free period is 75 to 85 days.

This unit is about 50 percent Jerry soil and 40 percent Millerlake soil.

Included in this unit are small areas of Cochetopa, Antrobus, Anvik, Skylick, Sligting, Yeljack, and Callings soils. Included areas make up about 10 percent of the total acreage.

The Jerry soil is deep and well drained. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is dark grayish brown loam about 11 inches thick. The subsoil is channery clay loam about 23 inches thick. The substratum to a depth of 60 inches is very channery clay loam. The content of coarse fragments ranges from 15 to 35 percent, by volume, in a major part of the subsoil and substratum.

Permeability is moderate in the Jerry soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

The Millerlake soil is deep and well drained. It formed in alluvium derived dominantly from sedimentary bedrock. Typically, the surface layer is dark gray loam about 19 inches thick. The subsoil is clay loam about 11 inches thick. The upper 14 inches of the substratum is clay loam. The lower part to a depth of 60 inches is very cobbly loam.

Permeability is moderately slow in the Millerlake soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, pasture, or wildlife habitat.

The potential plant community on the Jerry soil is mainly mountain brome, elk sedge, mountain snowberry, Gambel oak, and Saskatoon serviceberry. Other plants that characterize this site are slender wheatgrass, needlegrass, and western wheatgrass. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, Gambel oak, mountain snowberry, and Saskatoon serviceberry increase in abundance.

The potential plant community on the Millerlake soil is mainly bluebunch wheatgrass, Indian ricegrass, needlegrass, and Saskatoon serviceberry. Other plants that characterize this site are muttongrass, Idaho fescue, antelope bitterbrush, and mountain big sagebrush. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, mountain snowberry, and forbs increase in abundance. These plants are dominant when the range is in poor condition; therefore, livestock grazing should be managed so that the desired balance of the preferred species is maintained. If the condition of the range further deteriorates, Canada thistle, cheatgrass, stickseed, knotweed, tarweed, and houndstongue increase in abundance. Range seeding may be needed if the range is in poor condition.

This unit is well suited to hay and pasture. The main limitation is the restricted permeability. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

If this unit is used for homesite development, the main limitations are the shrink-swell potential and large stones. Population growth has resulted in increased construction of homes in areas of this unit. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

This map unit is in capability subclass VIe, irrigated and nonirrigated. The Jerry soil is in the Brushy Loam range site, and the Millerlake soil is in the Stony Loam range site.

66—Jerry-Millerlake loams, 6 to 25 percent slopes. This map unit is on alluvial fans and valley side slopes. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 37 to 40 degrees F, and the average frost-free period is 75 to 85 days.

This unit is about 50 percent Jerry soil and 40 percent Millerlake soil.

Included in this unit are small areas of Cochetopa, Antrobus, Anvik, Skylick, Sligting, Yeljack, and Callings soils. Included areas make up about 10 percent of the total acreage.

The Jerry soil is deep and well drained. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is dark grayish brown loam about 11 inches thick. The subsoil is channery clay loam about 23 inches thick. The substratum to a depth of 60 inches is very channery clay loam. The content of coarse fragments ranges from 15 to 35 percent, by volume, in a major part of the subsoil and substratum.

Permeability is moderate in the Jerry soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

The Millerlake soil is deep and well drained. It formed in alluvium derived dominantly from sedimentary bedrock. Typically, the surface layer is dark gray loam about 19 inches thick. The subsoil is clay loam about 11 inches thick. The upper 14 inches of the substratum is clay loam. The lower part to a depth of 60 inches is very cobbly loam.

Permeability is moderately slow in the Millerlake soil.

Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland, pasture, or wildlife habitat.

The potential plant community on the Jerry soil is mainly mountain brome, elk sedge, mountain snowberry, Gambel oak, and Saskatoon serviceberry. Other plants that characterize this site are slender wheatgrass, needlegrasses, and western wheatgrass. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, Gambel oak, mountain snowberry, and Saskatoon serviceberry increase in abundance.

The potential plant community on the Millerlake soil is mainly bluebunch wheatgrass, Indian ricegrass, needlegrass, and Saskatoon serviceberry. Other plants that characterize this site are muttongrass, Idaho fescue, antelope bitterbrush, and mountain big sagebrush. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, mountain snowberry, and forbs increase in abundance. These plants are dominant when the range is in poor condition; therefore, livestock grazing should be managed so that the desired balance of the preferred species is maintained. If the condition of the range further deteriorates, Canada thistle, cheatgrass, stickseed, knotweed, tarweed, and houndstongue increase in abundance. Range seeding may be needed if the range is in poor condition.

This unit is well suited to hay and pasture. The main limitation is the restricted permeability. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

If this unit is used for homesite development, the main limitations are the shrink-swell potential and large stones. Population growth has resulted in increased construction of homes in areas of this unit. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

This map unit is in capability subclass VIe, irrigated and nonirrigated. The Jerry soil is in the Brushy Loam range site, and the Millerlake soil is in the Stony Loam range site.

67—Jerry-Millerlake loams, 25 to 45 percent slopes. This map unit is on alluvial fans and valley side slopes. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 37 to 40 degrees F, and the average frost-free period is 75 to 85 days.

This unit is about 50 percent Jerry soil and 40 percent Millerlake soil.

Included in this unit are small areas of Cochetopa, Antrobus, Anvik, Skylick, Sligting, Yeljack, and Callings soils. Included areas make up about 10 percent of the total acreage.

The Jerry soil is deep and well drained. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is dark grayish brown loam about 11 inches thick. The subsoil is channery clay loam about 23 inches thick. The substratum to a depth of 60 inches is very channery clay loam. The content of coarse fragments ranges from 15 to 35 percent, by volume, in a major part of the subsoil and substratum.

Permeability is moderate in the Jerry soil. Available water capacity also is moderate. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is severe.

The Millerlake soil is deep and well drained. It formed in alluvium derived dominantly from sedimentary bedrock. Typically, the surface layer is dark gray loam about 18 inches thick. The subsoil is clay loam about 11 inches thick. The upper 14 inches of the substratum is clay loam. The lower part to a depth of 60 inches is very cobbly loam.

Permeability is moderately slow in the Millerlake soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland or as wildlife habitat.

The potential plant community on the Jerry soil is mainly mountain brome, elk sedge, mountain snowberry, Gambel oak, and Saskatoon serviceberry. Other plants that characterize this site are slender wheatgrass, other wheatgrasses, and needlegrasses. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, Gambel oak, mountain snowberry, and Saskatoon serviceberry increase in abundance.

The potential plant community on the Millerlake soil is mainly bluebunch wheatgrass, Indian ricegrass, needlegrass, and Saskatoon serviceberry. Other plants that characterize this site are muttongrass, Idaho fescue, antelope bitterbrush, and mountain big sagebrush. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, mountain snowberry, and forbs increase in abundance. These plants are dominant when the range is in poor condition; therefore, livestock grazing should be managed so that the desired balance of the preferred species is maintained. If the condition of the range

further deteriorates, Canada thistle, cheatgrass, stickseed, knotweed, tarweed, and houndstongue increase in abundance. The suitability of this unit for range seeding is poor.

If this unit is used for homesite development, the main limitations are the shrink-swell potential, large stones, and the slope. Population growth has resulted in increased construction of homes in areas of this unit. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

This map unit is in capability subclass VIIe, nonirrigated. The Jerry soil is in the Brushy Loam range site, and the Millerlake soil is in the Stony Loam range site.

68—Jodero loam, 1 to 12 percent slopes. This deep, well drained soil is on alluvial valley floors and in depressions. It formed in alluvium derived dominantly from basic andesite, sandstone, and shale. Elevation is 5,700 to 7,500 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 80 to 95 days.

Typically, the surface layer is dark grayish brown loam about 15 inches thick. The upper 17 inches of the substratum is stratified loam and silt loam. The lower part to a depth of 60 inches is stratified loam and clay loam.

Included in this unit are small areas of Yeljack, Callings, and Southace soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Jodero soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is slow or medium, and the hazard of water erosion is slight to severe on the steeper slopes.

This unit is used as hayland or pasture. It is well suited to hay and pasture. If properly managed, it can produce 2 tons of irrigated grass hay per acre annually.

If this unit is used for homesite development, the main limitations are the moderate frost action potential and the slope in the steeper areas. Buildings and roads should be designed to offset the limited ability of the soil to support a load. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage from onsite sewage disposal systems.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Mountain Swale range site.

69—Kilgore silt loam. This deep, poorly drained soil is on alluvial valley floors, flood plains, low terraces, and alluvial fans. It formed in alluvium derived dominantly from mixed sources. Elevation is 6,000 to 9,800 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 70 to 95 days.

Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The upper 21 inches of the substratum is silt loam. The next 4 inches is very gravelly sandy loam. The lower part to a depth of 60 inches is very gravelly loamy sand.

Included in this unit are small areas of Atencio, Azeltine, Showalter, Morval, and Empedrado soils. Included areas make up about 10 percent of the total acreage.

Permeability is moderately slow in the Kilgore soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight or moderate on the steeper slopes. A high water table is at a depth of 1 to 3 feet. The soil is occasionally flooded for very brief periods in spring and summer.

This unit is used as hayland, pasture, or rangeland. It is well suited to hay and pasture. Wetness limits the choice of suitable forage plants and the period of cutting or grazing and increases the risk of winterkill. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff. Applications of nitrogen fertilizer improve the growth of forage plants. If properly managed, the unit can produce 3.5 tons of irrigated grass hay per acre annually.

The potential plant community on this unit is mainly tufted hairgrass, Nebraska sedge, slender wheatgrass, ovalhead sedge, and willow. Other plants that characterize this site are western yarrow, Rocky Mountain iris, and shrubby cinquefoil. The average annual production of air-dry vegetation is about 3,000 pounds per acre. If the range condition deteriorates, willow, iris, and shrubby cinquefoil increase in abundance. If the condition of the range further deteriorates, Kentucky bluegrass and Canada thistle increase in abundance.

This unit is poorly suited to homesite development. The main limitations are seepage, the wetness, the frost action potential, and the flooding. A drainage system is needed if roads and building foundations are constructed.

This map unit is in capability subclass Vw, irrigated and nonirrigated. It is in the Mountain Meadow range site.

70—Kobar silty clay loam, 1 to 6 percent slopes. This deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived dominantly from Mancos shale. Elevation is 6,800 to 8,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 95 days.

Typically, the surface layer is grayish brown silty clay loam about 3 inches thick. The subsoil is silty clay loam about 32 inches thick. The upper 15 inches of the substratum is clay loam. The lower part to a depth of 60 inches or more is silty clay loam. The soil is calcareous throughout.

Included in this unit are small areas of Tanna soils and areas of soils that are similar to the Kobar soil but have a more well developed subsoil. Included areas make up about 10 percent of the total acreage.

Permeability is slow in the Kobar soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or hayland. The potential plant community is mainly western wheatgrass, Letterman needlegrass, muttongrass, slender wheatgrass, and mountain big sagebrush. Other plants that characterize this site are mulesear wyethia, nodding brome, and Saskatoon serviceberry. The average annual production of air-dry vegetation is about 1,600 pounds per acre. If the range condition deteriorates, mountain big sagebrush, rubber rabbitbrush, cheatgrass, and annual weeds increase in abundance and Kentucky bluegrass invades the site.

Range seeding may be needed if the range is in poor condition. For successful seeding, a seedbed should be prepared and the seed drilled. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase.

If furrow or corrugation irrigation systems are used, runs should be on the contour or across the slope. Irrigation water should be applied at a rate that ensures optimum production without increasing deep percolation and runoff rates and the hazard of erosion. Because of the restricted permeability, the length of runs should be adjusted to permit adequate infiltration of water. If properly managed, this unit can produce 3 tons of irrigated grass hay per acre annually.

Because of a high shrink-swell potential, low strength, and the slow permeability, this unit is severely limited as a site for urban and homesite development.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Deep Clay Loam range site.

71—Kobar silty clay loam, 6 to 12 percent slopes. This deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived dominantly from Mancos shale. Elevation is 6,800 to 8,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 95 days.

Typically, the surface layer is grayish brown silt clay loam about 3 inches thick. The subsoil is silty clay loam about 32 inches thick. The upper 15 inches of the substratum is clay loam. The lower part to a depth of 60 inches or more is silty clay loam. The soil is calcareous throughout.

Included in this unit are small areas of Tanna and Gothic soils and areas of soils that are similar to the Kobar soil but have a more well developed subsoil. Included areas make up about 10 percent of the total acreage.

Permeability is slow in the Kobar soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or hayland. The potential plant community is mainly western wheatgrass, Letterman needlegrass, muttongrass, slender wheatgrass, and mountain big sagebrush. Other plants that characterize this site are mulesear wyethia, nodding brome, and Saskatoon serviceberry. The average annual production of air-dry vegetation is about 1,600 pounds per acre. If the range condition deteriorates, mountain big sagebrush, rubber rabbitbrush, cheatgrass, and annual weeds increase in abundance and Kentucky bluegrass invades the site.

Range seeding may be needed if the range is in poor condition. For successful seeding, a seedbed should be prepared and the seed drilled. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase.

If furrow or corrugation irrigation systems are used, runs should be on the contour or across the slope. Irrigation water should be applied at a rate that ensures optimum production without increasing deep percolation and runoff rates and the hazard of erosion. Because of the restricted permeability, the length of runs should be adjusted to permit adequate infiltration of water. If properly managed, this unit can produce 3 tons of irrigated grass hay per acre annually.

Because of a high shrink-swell potential, low strength, and the slow permeability, this unit is severely limited as a site for urban and homesite development.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Deep Clay Loam range site.

72—Kobar silty clay loam, 12 to 25 percent slopes. This deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived dominantly from Mancos shale. Elevation is 6,800 to 8,200 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 95 days.

Typically, the surface layer is grayish brown silty clay loam about 3 inches thick. The subsoil is silty clay loam about 32 inches thick. The upper 15 inches of the substratum is clay loam. The lower part to a depth of 60 inches or more is silty clay loam. The soil is calcareous throughout.

Included in this unit are small areas of Tanna and Gothic soils and areas of soils that are similar to the Kobar soil but have a more well developed subsoil. Included areas make up about 10 percent of the total acreage.

Permeability is slow in the Kobar soil. Available water capacity is high. The effective rooting depth is 30 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland. The potential plant community is mainly western wheatgrass, Letterman needlegrass, muttongrass, slender wheatgrass, and mountain big sagebrush. Other plants that characterize this site are mulesear wyethia, nodding brome, and Saskatoon serviceberry. The average annual production of air-dry vegetation is about 1,600 pounds per acre. If the range condition deteriorates, mountain big sagebrush, rubber rabbitbrush, cheatgrass, and annual weeds increase in abundance and Kentucky bluegrass invades the site.

The suitability of this unit for range seeding is poor. The steeper areas are susceptible to erosion when disturbed. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

Because of a high shrink-swell potential, low strength, and the slow permeability, this unit is severely limited as a site for urban and homesite development.

This map unit is in capability subclass VIe, nonirrigated. It is in the Deep Clay Loam range site.

73—Kobar silty clay loam, dry, 3 to 25 percent slopes. This deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived dominantly from Mancos shale. Elevation is 6,800 to 7,400 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 95 days.

Typically, the surface layer is grayish brown silty clay loam about 3 inches thick. The subsoil is silty clay loam about 32 inches thick. The upper 15 inches of the substratum is clay loam. The lower part to a depth of 60 inches or more is silty clay loam. The soil is calcareous throughout.

Included in this unit are small areas of Tanna soils. Included areas make up about 10 percent of the total acreage.

Permeability is slow in the Kobar soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland or hayland. The potential plant community is mainly western wheatgrass, Indian ricegrass, muttongrass, bottlebrush squirreltail, Wyoming big sagebrush, and small rabbitbrush. Other plants that characterize this site are winterfat, prairie junegrass, fourwing saltbush, and Utah juniper. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, black greasewood, mountain big sagebrush, rubber rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Range seeding may be needed if the range is in poor condition. For successful seeding, a seedbed should be prepared and the seed drilled. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase.

If furrow or corrugation irrigation systems are used, runs should be on the contour or across the slope. Irrigation water should be applied at a rate that ensures optimum production without increasing deep percolation and runoff rates and the hazard of erosion. Because of the restricted permeability, the length of runs should be adjusted to permit adequate infiltration of water. If properly managed, this unit can produce 3 tons of irrigated grass hay per acre annually.

Because of a high shrink-swell potential, low strength, the slow permeability, and the slope in the steeper areas, this unit is severely limited as a site for urban and homesite development.

This map unit is in capability subclass IVe, irrigated, and VIe, nonirrigated. It is in the Clayey Foothills range site.

74—Leavittville loam, 4 to 25 percent slopes. This deep, well drained soil is on mesas (fig. 6). It formed in residuum derived dominantly from limestone and sandstone. Elevation is 8,500 to 9,200 feet. The average annual precipitation is 17 to 19 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 60 to 85 days.

Typically, the surface layer is dark grayish brown loam about 13 inches thick. The next layer is loam about 19 inches thick. The substratum to a depth of

Figure 6.—A typical area of Leavittville loam, 4 to 25 percent slopes, on the mesas above the Rock outcrop.

about 50 inches is light gravelly clay loam. Below this is soft limestone. The soil is noncalcareous to a depth of 13 inches and calcareous below that depth.

Included in this unit are small areas of Irrawaddy soils near the edges of mesas. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Leavittville soil. Available water capacity also is moderate. The effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is slight.

This unit is used for livestock grazing or wildlife habitat. The potential plant community is mainly Thurber fescue, slender wheatgrass, Columbia needlegrass, mountain big sagebrush, and mountain snowberry. Idaho fescue, nodding brome, and bearded wheatgrass also are included. The average annual production of air-dry vegetation is about 2,800 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, and Douglas rabbitbrush increase in abundance. Suitable management practices include proper grazing use and a planned grazing system.

If the quality of range vegetation has seriously deteriorated, seeding is needed. The main limitations are the slope and a short growing season. For successful seeding, a seedbed should be prepared and the seed drilled. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

This unit is suited to homesite development. The slope is a limitation in the steeper areas.

This map unit is in capability subclass VIe, nonirrigated. It is in the Subalpine Loam range site.

75—Millerlake loam, 15 to 30 percent slopes. This deep, well drained soil is on alluvial fans and valley side slopes. It formed in alluvium and outwash derived dominantly from sedimentary bedrock. Elevation is 8,500 to 10,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 70 to 85 days.

Typically, the surface layer is dark gray loam about 19 inches thick. The subsoil is clay loam about 11

inches thick. The upper 14 inches of the substratum is clay loam. The lower part to a depth of 60 inches is very cobbly loam.

Included in this unit are small areas of Millerlake soils on the steeper slopes, Evanston soils at the lower elevations, Cochetopa soils, and Jerry soils. Also included are small areas of Forsey soils on convex slopes. In some areas the depth to bedrock is as little as 40 inches. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in this Millerlake soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly muttongrass, western wheatgrass, bluebunch wheatgrass, mountain big sagebrush, Douglas rabbitbrush, and Saskatoon serviceberry. Other plants that characterize this site are prairie junegrass, basin wildrye, and mountain snowberry. The average annual production of air-dry vegetation is about 1,300 pounds per acre. If the range condition deteriorates, cheatgrass, Kentucky bluegrass, annual weeds, juniper, and pinyon increase in abundance. The suitability of this unit for range seeding is fair. The main limitation is the slope.

If this unit is used for homesite development, the main limitations are large stones and the slope.

This map unit is in capability subclass VIe, irrigated and nonirrigated. It is in the Deep Loam range site.

76—Mine loam, 12 to 25 percent slopes. This deep, well drained soil is on fans and valley side slopes. It formed in moderately coarse textured alluvium and colluvium derived dominantly from metamorphic rocks. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 70 to 80 days.

Typically, the surface layer is very dark grayish brown loam about 4 inches thick. The upper 33 inches of the substratum is gravelly sandy loam over cobbly sandy loam. The next 8 inches is very cobbly loamy sand. The lower part to a depth of 60 inches is very gravelly sandy loam.

Included in this unit are small areas of Sligting, Skylick, Uracca, Mergel, Ansel, Anvik, and Redrob soils. Included areas make up about 15 percent of the total acreage.

Permeability is rapid or very rapid in the Mine soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as woodland or as wildlife habitat. It has limited grazing value. It is not suitable as a source of sawtimber, but it can yield 70 to 90 cords of firewood per acre. After harvesting, carefully managed reforestation helps to control competition from undesirable understory plants. Competing vegetation can be controlled by properly preparing the site and by spraying, cutting, or girdling, which can eliminate unwanted weeds, brush, or trees. Among the trees that are suitable for planting are Engelmann spruce and subalpine fir.

This unit is poorly suited to homesite development. The main limitations are large stones and the slope.

This map unit is in capability subclass VIe, nonirrigated. It is in the Spruce-Fir or the Successional Aspen woodland site.

77—Mine loam, 25 to 65 percent slopes. This deep, well drained soil is on fans and valley side slopes. It formed in moderately coarse textured alluvium and colluvium derived dominantly from metamorphic rocks. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 70 to 80 days.

Typically, the surface layer is very dark grayish brown loam about 4 inches thick. The upper 33 inches of the substratum is gravelly sandy loam over cobbly sandy loam. The next 8 inches is very cobbly loamy sand. The lower part to a depth of 60 inches is very gravelly sandy loam.

Included in this unit are small areas of Sligting, Skylick, Uracca, Mergel, Ansel, Anvik, and Redrob soils. Included areas make up about 15 percent of the total acreage.

Permeability is rapid or very rapid in the Mine soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as woodland or as wildlife habitat. It has limited grazing value. It is not suitable as a source of sawtimber, but it can yield 70 to 90 cords of firewood per acre. After harvesting, carefully managed reforestation helps to control competition from undesirable understory plants. Competing vegetation can be controlled by properly preparing the site and by spraying, cutting, or girdling, which can eliminate unwanted weeds, brush, or trees. Among the trees that are suitable for planting are Engelmann spruce and subalpine fir.

This unit is poorly suited to homesite development. The main limitations are large stones and the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Spruce-Fir or Successional Aspen woodland site.

78—Miracle loam, 3 to 30 percent slopes. This moderately deep and well drained soil is on hills and ridges. It formed in residuum derived dominantly from redbed sandstone and shale. Elevation is 8,000 to 9,000 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 75 to 85 days.

Typically, the surface layer is reddish brown loam about 3 inches thick. The upper 4 inches of the subsoil is loam. The lower 11 inches is sandy clay loam. The substratum is fine sandy loam. Hard, red sandstone is at a depth of about 37 inches. The depth to bedrock ranges from 20 to 40 inches. The soil is noncalcareous to a depth of 31 inches and calcareous below that depth.

Included in this unit are small areas of deep soils that are similar to the Miracle soil but have a calcareous substratum. Also included are areas of sandstone Rock outcrop. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Miracle soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used for summer livestock grazing or wildlife habitat. The potential plant community is mainly Letterman needlegrass, western wheatgrass, mountain snowberry, and mountain big sagebrush. Other plants that characterize this site are slender wheatgrass, Douglas rabbitbrush, and Saskatoon serviceberry. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

If the quality of range vegetation has seriously deteriorated, seeding is needed. Seeding is difficult on slopes of more than 15 percent. For successful seeding, a seedbed should be prepared and the seed drilled. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

If this unit is used for homesite development, the main limitation is the slope. Deep cuts are needed to provide essentially level building foundations.

This map unit is in capability subclass VIe, nonirrigated. It is in the Mountain Loam range site.

79—Moen stony loam, 1 to 6 percent slopes. This moderately deep, well drained soil is on uplands and valley side slopes. It formed in mixed alluvium and colluvium derived dominantly from granite or hard sandstone. Elevation is 6,500 to 8,000 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 42 to 44 degrees F and the average frost-free period is 80 to 90 days.

Typically, the surface layer is very dark grayish brown stony loam about 4 inches thick. The upper 5 inches of the subsoil is gravelly loam. The lower part is gravelly sandy clay loam. Sandstone bedrock is at a depth of about 22 inches.

Included in this unit are small areas of Woodhall, Starley, Jerry, Millerlake, and Kilgore soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the Moen soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used for pasture or as rangeland. It is well suited to hay and pasture. Important management concerns in areas of irrigated hay and pasture are surface stoniness, the low available water capacity, and a short growing season. If properly managed, the unit can produce 3 tons of irrigated grass hay per acre annually. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion.

The potential plant community on this unit is mainly bluebunch wheatgrass, needleandthread, muttongrass, Wyoming big sagebrush, and scattered pinyon pine and Utah juniper. Other plants that characterize this site are Indian ricegrass, black sagebrush, and bottlebrush squirreltail. The average annual production of air-dry vegetation is about 600 pounds per acre. If the range condition deteriorates, sagebrush, broom snakeweed, and Douglas rabbitbrush increase in abundance. Range seeding may be needed if the range is in poor condition.

This unit is poorly suited to homesite development. The main limitations are the stony surface and the depth to bedrock.

This map unit is in capability subclass VIe, irrigated and nonirrigated. It is in the Stony Foothills range site.

80—Moen stony loam, 6 to 12 percent slopes. This moderately deep, well drained soil is on uplands and valley side slopes. It formed in mixed alluvium and colluvium derived dominantly from granite or hard sandstone. Elevation is 6,500 to 8,000 feet. The average annual precipitation is 18 to 20 inches, the

average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is very dark grayish brown stony loam about 4 inches thick. The upper 5 inches of the subsoil is gravelly loam. The lower part is gravelly sandy clay loam. Sandstone is at a depth of about 22 inches.

Included in this unit are small areas of Woodhall, Starley, Jerry, Millerlake, and Kilgore soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the Moen soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is severe.

This unit is used for pasture or as rangeland. It is well suited to hay and pasture. Important management concerns in areas of irrigated hay and pasture are surface stoniness, the low available water capacity, and a short growing season. If properly managed, the unit can produce 2.5 tons of irrigated grass hay per acre annually. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion.

The potential plant community on this unit is mainly bluebunch wheatgrass, needleandthread, muttongrass, Wyoming big sagebrush, and scattered pinyon pine and Utah juniper. Other plants that characterize this site are Indian ricegrass, black sagebrush, and bottlebrush squirreltail. The average annual production of air-dry vegetation is about 600 pounds per acre. If the range condition deteriorates, sagebrush, broom snakeweed, and Douglas rabbitbrush increase in abundance. Range seeding may be needed if the range is in poor condition.

This unit is poorly suited to homesite development. The main limitations are the surface stoniness and the depth to bedrock.

This map unit is in capability subclass VIe, irrigated and nonirrigated. It is in the Stony Foothills range site.

81—Moen stony loam, 12 to 25 percent slopes. This moderately deep, well drained soil is on uplands and valley side slopes. It formed in mixed alluvium and colluvium derived dominantly from granite or hard sandstone. Elevation is 6,500 to 8,000 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is very dark grayish brown stony loam about 4 inches thick. The upper 5 inches of the subsoil is gravelly loam. The lower part is gravelly sandy clay loam. Sandstone is at a depth of about 22 inches.

Included in this unit are small areas of Woodhall, Starley, Jerry, Millerlake, and Kilgore soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the Moen soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland. The potential plant community is mainly bluebunch wheatgrass, needleandthread, muttongrass, Wyoming big sagebrush, and scattered pinyon pine and Utah juniper. Other plants that characterize this site are Indian ricegrass, black sagebrush, and bottlebrush squirreltail. The average annual production of air-dry vegetation is about 600 pounds per acre. If the range condition deteriorates, sagebrush, broom snakeweed, and Douglas rabbitbrush increase in abundance. Range seeding may be needed if the range is in poor condition.

This unit is poorly suited to homesite development. The main limitations are the surface stoniness, the depth to bedrock, and the slope.

This map unit is in capability subclass VIe, nonirrigated. It is in the Stony Foothills range site.

82—Monad fine sandy loam, 12 to 25 percent slopes. This deep, well drained soil is on mountainsides and fans. It formed in alluvium and colluvium derived dominantly from sandstone and shale. Elevation is 7,800 to 9,300 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 60 to 75 days.

Typically, the upper part of the surface layer is grayish brown fine sandy loam about 2 inches thick. The lower part is grayish brown loam about 9 inches thick. The upper 26 inches of the subsoil is sandy clay loam. The lower 23 inches is clay loam.

Included in this unit are small areas of Youga and Forsey soils. Included areas make up about 10 percent of the total acreage.

Permeability is moderately slow in the Monad soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland. It also is used as wildlife habitat.

The potential plant community on this unit is mainly bluebunch wheatgrass, prairie junegrass, big bluegrass, mountain big sagebrush, and mountain snowberry. Other plants that characterize this site are slender wheatgrass, lanceleaf rabbitbrush, and Saskatoon serviceberry. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range

condition deteriorates, Kentucky bluegrass, rubber rabbitbrush, and annual weeds increase in abundance. The suitability of this unit for range seeding is fair. The main limitation is the slope. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase.

If this unit is used for homesite development, the main limitation is the slope. The slope is a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and help stabilize cut slopes.

This map unit is in capability subclass VIe, nonirrigated. It is in the Mountain Loam range site.

83—Monad fine sandy loam, 25 to 50 percent slopes. This deep, well drained soil is on mountainsides and fans. It formed in alluvium and colluvium derived dominantly from sandstone and shale. Elevation is 7,800 to 9,300 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 60 to 75 days.

Typically, the upper part of the surface layer is grayish brown fine sandy loam about 2 inches thick. The lower part is grayish brown loam about 9 inches thick. The upper 26 inches of the subsoil is sandy clay loam. The lower 23 inches is clay loam.

Included in this unit are small areas of Forsey soils. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Monad soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used mainly as rangeland. It also is used as wildlife habitat.

The potential plant community on this unit is mainly bluebunch wheatgrass, prairie junegrass, big bluegrass, mountain big sagebrush, and mountain snowberry. Other plants that characterize this site are slender wheatgrass, lanceleaf rabbitbrush, and Saskatoon serviceberry. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, Kentucky bluegrass, rubber rabbitbrush, and annual weeds increase in abundance. The suitability of this unit for range seeding is poor. The main limitations are the slope and stony areas. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Mountain Loam range site.

84—Morval loam, 1 to 6 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from basalt. Elevation is 6,800 to 8,000 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 95 days.

Typically, the surface layer is brown loam 7 inches thick. The upper 12 inches of the subsoil is clay loam. The lower 4 inches is loam. The substratum to a depth of 60 inches or more is loam. The soil is noncalcareous to a depth of 19 inches.

Included in this unit are small areas of Tridell and Showalter soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Morval soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight or moderate.

This unit is used as rangeland, as hayland, or for crops. The potential plant community is mainly needleandthread, western wheatgrass, muttongrass, prairie junegrass, and big sagebrush. Other plants that characterize this site are bluebunch wheatgrass and mountain muhly. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, cheatgrass and Kentucky bluegrass increase in abundance.

This unit is well suited to hay and pasture. If properly managed, it can produce 3 tons of irrigated grass hay per acre annually. The main limitations are a short growing season and the hazard of erosion on the steeper slopes.

This unit is well suited to irrigated crops. It is limited mainly by the short growing season and the hazard of erosion on the steeper slopes.

This unit is well suited to homesite development. The main limitation is a moderate shrink-swell potential.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Deep Loam range site.

85—Morval loam, 6 to 25 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from basalt. Elevation is 6,800 to 8,000 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 95 days.

Typically, the surface layer is brown loam about 7 inches thick. The upper 12 inches of the subsoil is clay

loam. The lower 4 inches is loam. The substratum to a depth of 60 inches or more is loam. The soil is noncalcareous to a depth of 19 inches.

Included in this unit are small areas of Tridell and Showalter soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Morval soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland. The potential plant community is mainly needleandthread, western wheatgrass, muttongrass, prairie junegrass, and big sagebrush. Other plants that characterize this site are bluebunch wheatgrass and mountain muhly. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, cheatgrass and Kentucky bluegrass increase in abundance.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential and the slope.

This map unit is in capability subclass VIe, nonirrigated. It is in the Deep Loam range site.

86—Morval loam, 25 to 40 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from basalt. Elevation is 6,800 to 8,000 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 95 days.

Typically, the surface layer is brown loam about 7 inches thick. The upper 12 inches of the subsoil is clay loam. The lower 4 inches is loam. The substratum to a depth of 60 inches or more is loam. The soil is noncalcareous to a depth of 19 inches.

Included in this unit are small areas of Tridell and Showalter soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Morval soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate or severe.

This unit is used as rangeland. The potential plant community is mainly needleandthread, western wheatgrass, muttongrass, prairie junegrass, and big sagebrush. Other plants that characterize this site are bluebunch wheatgrass and mountain muhly. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, cheatgrass and Kentucky bluegrass increase in abundance.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Deep Loam range site.

87—Morval-Tridell complex, 12 to 50 percent slopes. This map unit is on alluvial fans and mountainsides. Elevation is 6,800 to 8,000 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 95 days.

This unit is about 55 percent Morval loam and 30 percent Tridell moderately stony loam. The Morval soil is in slightly concave areas, and the Tridell soil is in convex areas.

Included in this unit are small areas of Showalter very stony loam and small areas of Rock outcrop. Included areas make up about 15 percent of the total acreage.

The Morval soil is deep and well drained. It formed in alluvium derived dominantly from basalt. Slope is 12 to 40 percent. Typically, the surface layer is brown loam about 7 inches thick. The upper 12 inches of the subsoil is clay loam. The lower 4 inches is loam. The substratum to a depth of 60 inches is loam. The soil is noncalcareous to a depth of 19 inches.

Permeability is moderate in the Morval soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

The Tridell soil is deep and somewhat excessively drained. It formed in alluvium and colluvium derived dominantly from basalt. Slope is 12 to 50 percent. Typically, the upper part of the surface layer is grayish brown stony sandy loam about 2 inches thick. The lower part is very cobbly fine sandy loam about 7 inches thick. The upper 5 inches of the substratum is very cobbly fine sandy loam. The next 11 inches is cobbly sandy loam. Below this is 12 inches of very stony fine sandy loam. The lower part of the substratum to a depth of 60 inches is very stony loamy sand.

Permeability is moderately rapid in the Tridell soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high.

This unit is used as rangeland or for firewood production.

The potential plant community on the Morval soil is mainly needleandthread, western wheatgrass, muttongrass, prairie junegrass, and big sagebrush. The average annual production of air-dry vegetation is about 1,500 pounds per acre.

The potential plant community on the Tridell soil is

mainly Utah juniper, pinyon pine, galleta, bluebunch wheatgrass, and bottlebrush squirreltail. The potential production of the native understory vegetation in normal years is about 400 pounds of air-dry vegetation per acre.

Mechanical treatment is not practical on this unit because of the stony surface and the slope. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

The Tridell soil is suited to limited production of firewood. The average annual production is 5 cords per acre. The average stocking rate is 150 trees per acre. Special care is needed to minimize erosion when the stands are thinned and when other forest management practices are applied.

This unit is poorly suited to homesite development. The main limitations are large stones and the slope.

This map unit is in capability subclass VIIe, nonirrigated. The Morval soil is in the Deep Loam range site, and the Tridell soil is in the Pinyon-Juniper woodland site.

88—Moyerson-Rock outcrop complex, 15 to 60 percent slopes. This map unit is on mountainsides and ridges. Elevation is 7,500 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 42 degrees F, and the average frost-free period is 75 to 85 days.

This unit is about 60 percent Moyerson silty clay loam and 25 percent shale Rock outcrop. The Moyerson soil is in the less steeply sloping areas, and the Rock outcrop is in the steeper positions on the landscape.

Included in this unit are small areas of soils that are similar to the Moyerson soil but have channery fragments covering 20 to 25 percent of the surface. Included areas make up about 15 percent of the total acreage.

The Moyerson soil is shallow and well drained. It formed in alluvium and colluvium derived dominantly from shale and sandstone. About 5 to 15 percent of the surface is covered with channery fragments. Typically, the surface layer is grayish brown silty clay loam about 5 inches thick. The upper 5 inches of the substratum is silty clay loam. The lower part to a depth of 16 inches is clay. Shale bedrock is at a depth of 10 to 20 inches.

Permeability is slow in the Moyerson soil. Available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is high.

The Rock outcrop is weathered to a depth of 5 to 10 inches in places.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly Utah juniper, pinyon pine, Utah serviceberry, true mountainmahogany, Indian ricegrass, and western wheatgrass. The potential production of the native understory vegetation in normal years is about 300 pounds of air-dry vegetation per acre.

The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. Suitable management practices include proper range use, deferred grazing, and rotation grazing.

This unit is very poorly suited to homesite development. The main limitations are the depth to shale bedrock, the shrink-swell potential, a very low load-supporting capacity, the slow permeability, and the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Pinyon-Juniper woodland site.

89—Mussel loam, 1 to 6 percent slopes. This deep, well drained soil is on terraces and foot slopes. It formed in alluvium. Elevation is 6,500 to 7,500 feet. The average annual precipitation is 13 to 14 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 75 to 90 days.

Typically, the surface layer is light gray loam about 8 inches thick. The upper 34 inches of the substratum is sandy clay loam. The lower part to a depth of 60 inches is gravelly sandy clay loam.

Included in this unit are small areas of Yamo soils. Included areas make up about 10 percent of the total acreage.

Permeability is moderate in the Mussel soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used as hayland or for homesite development. If it is used as hayland, the main limitation is low fertility. Grasses and legumes grow well if adequate fertilizer is used. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

The suitability of this unit for range seeding is good. The potential plant community is mainly western wheatgrass, needleandthread, Nevada bluegrass, Sandberg bluegrass, and big sagebrush. The average annual production of air-dry vegetation is about 800 pounds per acre.

This unit is well suited to homesite development.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Rolling Loam range site.

90—Mussel loam, 6 to 12 percent slopes. This deep, well drained soil is on terraces, fans, and foot slopes. It formed in alluvium. Elevation is 6,500 to 7,500 feet. The average annual precipitation is 13 to 14 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 75 to 90 days.

Typically, the surface layer is light gray loam about 8 inches thick. The upper 34 inches of the substratum is sandy clay loam. The lower part to a depth of 60 inches is gravelly sandy clay loam.

Included in this unit are small areas of Yamo soils. Included areas make up about 10 percent of the total acreage.

Permeability is moderate in the Mussel soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate.

This unit is used as hayland, as rangeland, or for urban development. It is suited to hay and pasture. The main management concerns are low fertility and the slope. Grasses and legumes grow well if adequate fertilizer is used. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

The potential plant community on this unit is mainly western wheatgrass, needleandthread, Nevada bluegrass, Sandberg bluegrass, and big sagebrush. The average annual production of air-dry vegetation is about 800 pounds per acre.

Areas that are heavily infested with undesirable plants can be improved by chemical or mechanical treatment. If the quality of range vegetation has seriously deteriorated, seeding is needed.

If this unit is used for homesite development, the main limitation is the slope in the steeper areas. The slope is also a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and help stabilize cut slopes.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Rolling Loam range site.

91—Mussel loam, 12 to 25 percent slopes. This deep, well drained soil is on fans and foot slopes. It formed in alluvium. Elevation is 6,500 to 7,500 feet. The average annual precipitation is 13 to 14 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 75 to 90 days.

Typically, the surface layer is light gray loam about 8 inches thick. The upper 34 inches of the substratum is sandy clay loam. The lower part to a depth of 60 inches is gravelly sandy clay loam.

Included in this unit are small areas of Yamo soils and soils that are similar to the Mussel soil but have slopes of 6 to 12 percent. Included areas make up about 10 percent of the total acreage.

Permeability is moderate in the Mussel soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or for urban development. The potential plant community is mainly western wheatgrass, Nevada bluegrass, Sandberg bluegrass, needleandthread, and big sagebrush. The average annual production of air-dry vegetation is about 800 pounds per acre.

Range seeding may be needed if the range is in poor condition. The main limitations are the slope and the limited availability of irrigation water. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase.

If this unit is used for homesite development, the main limitation is the slope. The slope is also a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and help stabilize cut slopes.

This map unit is in capability subclass VIe, nonirrigated. It is in the Rolling Loam range site.

92—Redrob loam, 1 to 6 percent slopes. This deep, somewhat poorly drained soil is on alluvial valley floors, low terraces, and flood plains. It formed in mixed alluvium derived dominantly from sandstone and shale. Elevation is 5,800 to 7,200 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is dark grayish brown loam about 14 inches thick. The next layer is stratified stony loam about 6 inches thick. The substratum to a depth of 60 inches is stony and very cobbly loamy sand and sand.

Included in this unit are small areas of Fluvaquents and Atencio, Azeltine, Showalter, and Morval soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the surface layer of the Redrob soil and rapid in the rest of the profile. Available water capacity is low. The effective rooting depth is 60 inches for water-tolerant plants but is 20 to 40 inches for other plants. Runoff is slow, and the hazard of water erosion is slight or moderate on the steeper slopes. A high water table is at a depth of 18 to 48 inches

throughout the year. This soil is subject to rare flooding of brief duration. Ice jams may cause flooding during prolonged cold periods in winter.

This unit is used for irrigated hay and pasture or as wildlife habitat. It is well suited to hay and pasture. The main limitations are the restricted rooting depth for plants that are not water-tolerant and a short growing season. The wetness limits the choice of suitable forage plants and the period of cutting or grazing and increases the risk of winterkill. Irrigation water can be applied by furrow, border, corrugation, and sprinkler methods.

This unit provides food and cover for waterfowl and other wetland wildlife.

This unit is poorly suited to homesite development. The main limitations are the wetness and the hazard of flooding.

This map unit is in capability subclass IVw, irrigated and nonirrigated. It is in the Riverbottom range site.

93—Rogert very stony sandy loam, 25 to 65 percent slopes. This shallow, well drained soil is on mountainsides. It formed in residuum derived dominantly from granite. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 36 to 38 degrees F, and the average frost-free period is 35 to 60 days.

Typically, the upper part of the surface layer is dark grayish brown very stony sandy loam about 6 inches thick. The lower part is brown very gravelly sandy loam about 11 inches thick. Hard granite is at a depth of 10 to 20 inches. The soil is noncalcareous throughout.

Included in this unit are small areas of soils that are similar to the Rogert soil but are finer textured and deeper over granite bedrock. Also included are small areas of soils that are similar to the Rogert soil but have a lighter colored surface layer. Included areas make up about 15 percent of the total acreage.

Permeability is moderately rapid or rapid in the Rogert soil. Available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used for livestock grazing or wildlife habitat. The potential plant community is mainly western wheatgrass, bluebunch wheatgrass, prairie junegrass, and mountain big sagebrush. Other plants that characterize this site are needleandthread, Indian ricegrass, Idaho fescue, and small numbers of many forbs. Some areas of aspen are also included. The average annual production of air-dry vegetation is about 1,000 pounds per acre.

The suitability of this unit for range seeding is poor. The main limitations are the slope and the surface stoniness. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management.

This unit is poorly suited to homesite development. The main limitations are the slope and the depth to bedrock.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Rocky Loam range site.

94—Showalter-Morval complex, 5 to 15 percent slopes. This map unit is on alluvial fans, high terraces, and valley sides. Elevation is 7,000 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 80 to 90 days.

This unit is about 45 percent Showalter very stony loam and 35 percent Morval loam. The Showalter soil is in convex areas, and the Morval soil is in the more concave areas.

Included in this unit are small areas of soils that are similar to the Morval soil but have a thicker surface layer. Also included are small areas of soils that are similar to the Morval soil but have 30 to 40 percent cobbles in the substratum. Included areas make up about 20 percent of the total acreage.

The Showalter soil is deep and well drained. It formed in alluvium derived dominantly from basalt. About 10 to 15 percent of the surface is covered with stones, 5 percent with cobbles, and 5 percent with gravel. Typically, the surface layer is brown very stony loam about 8 inches thick. The upper 3 inches of the subsoil is very cobbly clay loam. The lower 28 inches is very cobbly clay. The substratum to a depth of 60 inches or more is very cobbly clay loam.

Permeability is slow in the Showalter soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

The Morval soil is deep and well drained. It formed in alluvium derived dominantly from basalt. Typically, the surface layer is brown loam about 7 inches thick. The upper 12 inches of the subsoil is clay loam. The lower 4 inches is loam. The substratum to a depth of 60 inches is loam. The soil is noncalcareous to a depth of 19 inches and calcareous below that depth.

Permeability is moderate in the Morval soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as hayland or rangeland, for crops, or for homesite development. It is moderately suited to hay and crops. The main limitations are the surface stoniness, the slope, and the slow permeability.

Grasses and legumes grow well if adequate fertilizer is used. Limiting tillage for seedbed preparation and controlling weeds help to control runoff and erosion. If properly managed, the unit can produce 3 tons of irrigated grass hay or 60 bushels of barley per acre annually.

The potential plant community on the Showalter soil is mainly bluebunch wheatgrass, western wheatgrass, prairie junegrass, Indian ricegrass, true mountainmahogany, antelope bitterbrush, Saskatoon serviceberry, and big sagebrush. The average annual production of air-dry vegetation is about 900 pounds per acre.

The potential plant community on the Morval soil is mainly needleandthread, western wheatgrass, muttongrass, prairie junegrass, and big sagebrush. The average annual production of air-dry vegetation is about 1,500 pounds per acre.

The main limitation for range seeding or mechanical treatment is the surface stoniness in areas of the Showalter soil. Range seeding generally is restricted to broadcasting because of this limitation.

This unit is poorly suited to homesite development. The main limitations are the shrink-swell potential and the stones throughout the profile.

This map unit is in capability subclass VIe, irrigated and nonirrigated. The Showalter soil is in the Loamy Slopes range site, and the Morval soil is in the Deep Loam range site.

95—Showalter-Morval complex, 15 to 25 percent slopes. This map unit is on alluvial fans, high terraces, and valley sides (fig. 7). Elevation is 7,000 to 8,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 80 to 90 days.

This unit is about 45 percent Showalter very stony loam and 35 percent Morval loam. The Showalter soil is in convex areas, and the Morval soil is in the more concave areas.

Included in this unit are small areas of soils that are similar to the Morval soil but have 30 to 50 percent cobbles in the substratum. Included areas make up about 20 percent of the total acreage.

The Showalter soil is deep and well drained. It formed in alluvium derived dominantly from basalt. About 10 to 15 percent of the surface is covered with stones, 5 percent with cobbles, and 5 percent with gravel. Typically, the surface layer is brown very stony loam about 8 inches thick. The upper 3 inches of the subsoil is very cobbly clay loam. The lower 28 inches is very cobbly clay. The substratum to a depth of 60 inches or more is very cobbly clay loam.

Permeability is slow in the Showalter soil. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

The Morval soil is deep and well drained. It formed in alluvium derived dominantly from basalt. Typically, the surface layer is brown loam about 7 inches thick. The upper 12 inches of the subsoil is clay loam. The lower 4 inches is loam. The substratum to a depth of 60 inches is loam. The soil is noncalcareous to a depth of 19 inches and calcareous below that depth.

Permeability is moderate in the Morval soil. Available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used as rangeland or hayland or for homesite development.

The potential plant community on the Showalter soil is mainly bluebunch wheatgrass, western wheatgrass, prairie junegrass, Indian ricegrass, true mountainmahogany, antelope bitterbrush, Saskatoon serviceberry, and big sagebrush. The average annual production of air-dry vegetation is about 900 pounds per acre.

The potential plant community on the Morval soil is mainly needleandthread, western wheatgrass, muttongrass, prairie junegrass, and big sagebrush. The average annual production of air-dry vegetation is about 1,500 pounds per acre.

The main limitation for range seeding or mechanical treatment is the surface stoniness in areas of the Showalter soil. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management.

If this unit is used for hay and pasture, the main limitations are the surface stoniness, the slope, and the slow permeability in the Showalter soil. Grasses and legumes grow well if adequate fertilizer is used.

This unit is very poorly suited to homesite development. The main limitations are the slope, the shrink-swell potential, and the stones throughout the profile.

This map unit is in capability subclass VIe, nonirrigated. The Showalter soil is in the Loamy Slopes range site, and the Morval soil is in the Deep Loam range site.

96—Southace cobbly sandy loam, 1 to 6 percent slopes. This deep, well drained soil is on upland terraces, mountainsides, and alluvial fans. It formed in alluvium derived dominantly from redbed sandstone and shale intermixed with gypsiferous material. Elevation is 6,000 to 7,000 feet. The average annual precipitation is

Figure 7.—An area of Showalter-Morval complex, 15 to 25 percent slopes, in the foreground. The irrigated soil in the valley is mainly Almy loam, 1 to 12 percent slopes.

14 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 95 to 105 days.

Typically, the surface layer is reddish brown cobbly sandy loam about 3 inches thick. The upper 11 inches of the substratum is gravelly loam. The next 12 inches is very gravelly loam. The lower part to a depth of 60 inches or more is very cobbly fine sandy loam. The content of stones and cobbles increases with depth. Some flagstones are in the profile in some areas.

Included in this unit are small areas of Morval, Goslin, and Tridell soils. Morval and Goslin soils have slopes of less than 12 percent. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Southace soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate.

Most areas of this unit are used as rangeland. A few areas are used for homesite development or as wildlife browse areas.

The potential plant community on this unit is mainly western wheatgrass, Indian ricegrass, muttongrass, Wyoming big sagebrush, and Utah serviceberry. Needleandthread, Douglas rabbitbrush, squaw apple, and scattered Utah juniper commonly are also included. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. The suitability of this unit for range seeding is poor. The main limitation is the surface stoniness. Because of the hazard of seepage, the soil is limited as a site for livestock watering ponds and other water impoundments.

If this unit is used for homesite development, the main limitations are the hazard of erosion, the stoniness, and the susceptibility to piping and frost heave. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris. Preserving the existing plant cover during construction helps to control erosion. Only the part of the site that is used for construction should be disturbed. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns.

This map unit is in capability subclass VIe, nonirrigated. It is in the Loamy Slopes range site.

97—Southace cobbly sandy loam, 6 to 12 percent slopes. This deep, well drained soil is on upland terraces, mountainsides, and alluvial fans. It formed in alluvium derived dominantly from redbed sandstone and shale intermixed with gypsiferous material. Elevation is 6,000 to 7,000 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 95 to 105 days.

Typically, the surface layer is reddish brown cobbly sandy loam about 3 inches thick. The upper 11 inches of the substratum is gravelly loam. The next 12 inches is very gravelly loam. The lower part to a depth of 60 inches or more is very cobbly fine sandy loam. The content of stones and cobbles increases with depth. Some flagstones are in the profile in some areas.

Included in this unit are small areas of Morval, Goslin, and Tridell soils. Morval and Goslin soils have slopes of less than 12 percent. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Southace soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

Most areas of this unit are used as rangeland. A few areas are used for homesite development or as wildlife habitat.

The potential plant community on this unit is mainly western wheatgrass, Indian ricegrass, muttongrass, Wyoming big sagebrush, and Utah serviceberry. Needleandthread, Douglas rabbitbrush, squaw apple, and scattered Utah juniper commonly are also included. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. The suitability of this unit for range seeding is poor. The main limitation is the surface stoniness. Because of the hazard of seepage, the soil is limited as a site for livestock watering ponds and other impoundments.

If this unit is used for homesite development, the main limitations are the hazard of erosion, the stoniness, and the susceptibility to piping and frost heave. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris. Preserving the existing plant cover during construction helps to control erosion. Only the part of the site that is used for construction should be disturbed. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns.

This map unit is in capability subclass VIe, nonirrigated. It is in the Loamy Slopes range site.

98—Southace cobbly sandy loam, 12 to 25 percent slopes. This deep, well drained soil is on upland terraces, mountainsides, the sides of mountains and valleys, and alluvial fans. It formed in alluvium and colluvium derived dominantly from redbed sandstone and shale intermixed with gypsiferous material. Elevation is 6,000 to 7,000 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 95 to 105 days.

Typically, the surface layer is light reddish brown cobbly sandy loam about 3 inches thick. The upper 11 inches of the substratum is gravelly loam. The next 12 inches is very gravelly loam. The lower part to a depth of 60 inches or more is very cobbly fine sandy loam. The content of stones and cobbles increases with depth. Some flagstones are in the profile in places.

Included in this unit are small areas of Tridell soils on benchtops and the upper part of slopes. Included areas make up about 10 percent of the total acreage.

Permeability is moderate in the Southace soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly western wheatgrass, Indian ricegrass, muttongrass, Wyoming big sagebrush, and Utah serviceberry. Needleandthread, Douglas rabbitbrush, squaw apple, and scattered Utah juniper commonly are also included.

The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. The suitability of this unit for range seeding is poor. The main limitations are the slope and the surface stoniness.

If this unit is used for homesite development, the main limitations are the slope, the hazard of erosion, the stoniness, and the susceptibility to piping and frost heave. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris. Preserving the existing plant cover during construction helps to control erosion. Only the part of the site that is used for construction should be disturbed. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns.

This map unit is in capability subclass VIe, nonirrigated. It is in the Loamy Slopes range site.

99—Southace cobbly sandy loam, 25 to 65 percent slopes. This deep, well drained soil is on the sides of mountains and valleys and on alluvial fans. It formed in alluvium and colluvium derived dominantly from redbed sandstone and shale intermixed with gypsiferous material. Elevation is 6,000 to 7,000 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 95 to 105 days.

Typically, the surface layer is reddish brown cobbly sandy loam about 3 inches thick. The upper 11 inches of the substratum is gravelly loam. The next 10 inches is very gravelly loam. The lower part to a depth of 60 inches or more is very cobbly fine sandy loam. The content of stones and cobbles increases with depth. Some flagstones are in the profile in places.

Included in this unit are small areas of Tridell soils and rock outcrop. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Southace soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as wildlife habitat or rangeland. The potential plant community is mainly western wheatgrass, Indian ricegrass, muttongrass, Wyoming big sagebrush, and Utah serviceberry. Needleandthread, Douglas rabbitbrush, squaw apple, and scattered Utah juniper commonly are also included. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. The main limitations are the slope and the surface stoniness. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. Livestock grazing should be managed to protect the soil from excessive erosion. Loss of the surface layer severely reduces the ability of the unit to produce plants suitable for grazing.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Loamy Slopes range site.

100—Starley-Starman very channery loams, 3 to 25 percent slopes. This map unit is on rolling uplands, ridgetops, and mountainsides. The native vegetation is mainly grasses and shrubs. Elevation is 7,800 to 9,000 feet. The average precipitation is 16 to 19 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 60 to 75 days.

This unit is about 50 percent Starley soil and 30 percent Starman soil.

Included in this unit are small areas of Irrawaddy soils in depressions and small areas of soils that are similar to the Starley and Starman soils but are underlain by soft bedrock. Also included are areas of rock outcrop on knolls and ridges. Included areas make up about 20 percent of the total acreage.

The Starley soil is shallow and well drained. It formed in residuum derived dominantly from calcareous sandstone. About 35 to 45 percent of the surface is covered with cobbly fragments. Typically, the surface layer is brown very channery loam about 8 inches thick. The subsoil is channery clay loam about 7 inches thick. The substratum is very channery loam about 4 inches thick over hard sandstone. The soil is calcareous throughout.

Permeability is moderate in the Starley soil. Available water capacity is very low. The effective rooting depth is 8 to 20 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or severe.

The Starman soil is shallow and well drained. It formed in residuum derived dominantly from sandstone. About 35 to 45 percent of the surface is covered with cobbly fragments. Typically, the surface layer is yellowish brown very channery loam about 6 inches thick. The upper 4 inches of the substratum is very channery loam. The lower part is very channery loam. Sandstone bedrock is at a depth of about 16 inches. The soil is calcareous throughout.

Permeability is moderate in the Starman soil. Available water capacity is very low. The effective rooting depth is 6 to 20 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or severe.

This unit is used for livestock grazing or wildlife habitat.

The potential plant community on the Starley soil is mainly bluebunch wheatgrass, Indian ricegrass, prairie junegrass, mountain big sagebrush, and Saskatoon serviceberry. Other plants that characterize this site are Nevada bluegrass, Douglas rabbitbrush, and western wheatgrass. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, cheatgrass, fringed sagebrush, big sagebrush, and annual weeds increase in abundance.

The potential plant community on the Starman soil is mainly bluebunch wheatgrass, needleandthread, Indian ricegrass, winterfat, and fringed sagebrush. Other plants that characterize this site are Nevada bluegrass, Douglas rabbitbrush, and western wheatgrass. The average annual production of air-dry vegetation is about 400 pounds per acre. If the range condition deteriorates, cheatgrass, fringed sagebrush, big sagebrush, and annual weeds increase in abundance.

Suitable management practices include proper grazing use and a planned grazing system. Mechanical treatment is not practical because of the stony surface and the slope.

If this unit is used for homesite development, the main limitations are the depth to bedrock and the slope in the steeper areas.

This map unit is in capability subclass VIIe, nonirrigated. The Starley soil is in the Loamy Slopes range site, and the Starman soil is in the Dry Exposure range site.

101—Tanna-Pinelli complex, 1 to 6 percent slopes. This map unit is on fans and valley sides. Elevation is 6,500 to 8,300 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 80 to 90 days.

This unit is about 45 percent Tanna soil and 45 percent Pinelli soil.

Included in this unit are small areas of Dollard and Moyerson soils. Included areas make up about 10 percent of the total acreage.

The Tanna soil is moderately deep and well drained. It formed in alluvium and residuum. Typically, the surface layer is grayish brown silt loam about 3 inches thick. The subsoil is silty clay loam about 21 inches thick. The substratum is silty clay loam 31 inches thick over shale. The depth to shale ranges from 20 to 40 inches. The soil is noncalcareous to a depth of 0 to 10 inches and calcareous below that depth.

Permeability is slow in the Tanna soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate.

The Pinelli soil is deep and well drained. It formed in alluvium derived dominantly from sedimentary bedrock. Typically, the surface layer is yellowish brown loam about 7 inches thick. The subsoil is clay loam about 15 inches thick. The substratum to a depth of 60 inches or more is clay loam. The soil is noncalcareous to a depth of 11 inches.

Permeability is moderately slow in the Pinelli soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly western wheatgrass, Indian ricegrass, bottlebrush squirreltail, mountain big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are prairie junegrass, muttongrass, bluebunch wheatgrass, and common snowberry. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Range seeding may be needed if the range is in poor condition. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase.

If the Tanna soil is used for homesite development, the main limitations are the shrink-swell potential and the depth to shale. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content around the foundation. Backfilling excavations with material that has a low shrink-swell potential can also reduce the effects of shrinking and swelling. Septic tank absorption fields of conventional size do not function adequately because of the slow permeability. Other kinds of sewage disposal systems may be needed. The effluent from septic tank absorption fields can surface in downslope areas and thus create a health hazard.

The Pinelli soil is suited to homesite development. The shrink-swell potential is a limitation. It can be minimized by prewetting the foundation area.

This map unit is in capability subclass IVe, nonirrigated. It is in the Clayey Foothills range site.

102—Tanna-Pinelli complex, 6 to 12 percent slopes. This map unit is on fans and valley sides.

Elevation is 6,500 to 8,300 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 80 to 90 days.

This unit is about 45 percent Tanna soil and 45 percent Pinelli soil.

Included in this unit are small areas of Dollard and Moyerson soils. Included areas make up about 10 percent of the total acreage.

The Tanna soil is moderately deep and well drained. It formed in alluvium and residuum. Typically, the surface layer is grayish brown silt loam about 3 inches thick. The subsoil is silty clay loam about 21 inches thick. The substratum is silty clay loam 31 inches thick over shale. The depth to shale ranges from 20 to 40 inches.

Permeability is slow in the Tanna soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate.

The Pinelli soil is deep and well drained. It formed in alluvium derived dominantly from sedimentary bedrock. Typically, the surface layer is yellowish brown loam about 7 inches thick. The subsoil is clay loam about 15 inches thick. The substratum to a depth of 60 inches or more is clay loam. The soil is noncalcareous to a depth of 11 inches.

Permeability is moderately slow in the Pinelli soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat. It is poorly suited to homesite development. The main limitations are a high shrink-swell potential, the depth to bedrock, and the slow permeability in the Tanna soil.

The potential plant community on this unit is mainly western wheatgrass, Indian ricegrass, bottlebrush squirreltail, mountain big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are prairie junegrass, muttongrass, bluebunch wheatgrass, and common snowberry. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance. Juniper has invaded in some areas.

Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase.

If the Tanna soil is used for homesite development, the main limitations are the shrink-swell potential and the slope in the steeper areas. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content around the foundation. Backfilling excavations with material that has a low shrink-swell potential can also reduce the effects of shrinking and swelling. Septic tank absorption fields of conventional size do not function adequately because of the slow permeability. Other kinds of sewage disposal systems may be needed. The effluent from septic tank absorption fields can surface in downslope areas and thus create a health hazard.

The Pinelli soil is suited to homesite development. The main limitation is the slope in the steeper areas.

This map unit is in capability subclass IVe, nonirrigated. It is in the Clayey Foothills range site.

103—Tanna-Pinelli complex, 12 to 25 percent slopes. This map unit is on fans and valley sides. Elevation is 6,500 to 8,300 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 80 to 90 days.

This unit is about 50 percent Tanna soil and 40 percent Pinelli soil.

Included in this unit are small areas of Dollard and Moyerson soils. Included areas make up about 10 percent of the total acreage.

The Tanna soil is moderately deep and well drained. It formed in alluvium and residuum. Typically, the surface layer is grayish brown silt loam about 3 inches thick. The subsoil is silty clay loam about 21 inches thick. The substratum is silty clay loam 31 inches thick over shale. The depth to shale ranges from 20 to 40 inches. The soil is noncalcareous to a depth of 10 inches and calcareous below that depth.

Permeability is slow in the Tanna soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is moderate.

The Pinelli soil is deep and well drained. It formed in alluvium derived dominantly from sedimentary bedrock. Typically, the surface layer is yellowish brown loam about 7 inches thick. The subsoil is clay loam about 15 inches thick. The substratum to a depth of 60 inches or more is clay loam. The soil is noncalcareous to a depth of 11 inches.

Permeability is moderately slow in the Pinelli soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly western wheatgrass, Indian ricegrass, bottlebrush squirreltail, mountain big sagebrush, and Douglas rabbitbrush.

Other plants that characterize this site are prairie junegrass, muttongrass, bluebunch wheatgrass, and common snowberry. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. In areas where brush is removed by prescribed burning or by chemical or mechanical methods, the hazard of erosion may increase.

If the Tanna soil is used for homesite development, the main limitations are the slope and the shrink-swell potential. The effects of shrinking and swelling can be reduced by maintaining a constant moisture content around the foundation. Backfilling excavations with material that has a low shrink-swell potential can also reduce the effects of shrinking and swelling. The deep cuts needed to provide essentially level building sites can expose bedrock. Septic tank absorption fields of conventional size do not function adequately because of the slow permeability. Other kinds of sewage disposal systems may be needed. The effluent from septic tank absorption fields can surface in downslope areas and thus create a health hazard.

If the Pinelli soil is used for homesite development, the main limitation is the slope. The slope is also a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour. Access roads should be designed to control surface runoff and help stabilize cut slopes.

This map unit is in capability subclass VIe, nonirrigated. It is in the Clayey Foothills range site.

104—Torriorthents-Camborthids-Rock outcrop complex, 6 to 65 percent slopes. This map unit is on moderately sloping to steep, mainly south-facing mountainsides, hills, ridges, and foot slopes. It is on canyon side slopes throughout the survey area, particularly where major drainageways cut deep canyons.

This unit is about 45 percent Torriorthents, 20 percent Camborthids, and 15 percent Rock outcrop.

Included in this unit are small areas of Monad, Iyers, Earsman, Brownsto, Cushool, Dollard, Ansari, and Almy soils. Included areas make up about 20 percent of the total acreage.

The Torriorthents are shallow or moderately deep and are well drained. They formed in residuum and colluvium derived dominantly from sedimentary rock. The surface is generally covered with stones. The surface layer ranges from reddish brown to brown. The soils range from fine sandy loam to clay loam and have a variable content of gravel, cobbles, and stones. The depth to shale or sandstone is 4 to 30 inches.

Permeability is moderate in the Torriorthents. Available water capacity is low. The effective rooting depth is 4 to 30 inches. Runoff is rapid, and the hazard of water erosion is severe.

The Camborthids are shallow to deep and are well drained. They formed in residuum and colluvium derived dominantly from sandstone shale and basalt. Typically, these soils have a light colored surface layer and are clay loam or loam. They are generally free of stones throughout the profile, but scattered basalt stones, cobbles, and sandstone rock fragments are on the surface. The content of clay in the subsoil increases slightly with depth.

Permeability is moderate in the Camborthids. Available water capacity is low or moderate. The effective rooting depth is 15 to 60 inches. Runoff is rapid, and the hazard of water erosion is severe.

The Rock outcrop consists mainly of barren sandstone, shale, and basalt.

This unit is used as wildlife habitat. The native vegetation is a rather sparse stand of grasses, forbs, pinyon, and Utah juniper.

This unit is poorly suited to homesite development. The main limitations are the slope, the depth to bedrock, and large stones.

This map unit is in capability subclass VIIe, nonirrigated. No range site is assigned.

105—Torriorthents-Rock outcrop complex, 45 to 95 percent slopes. This map unit is on steep or extremely steep, mainly south-facing mountainsides, hills, and ridges. It occurs throughout the survey area, particularly where major drainageways cut deep canyons.

This unit is about 45 percent Torriorthents and 35 percent Rock outcrop.

Included in this unit are small areas of Monad, Iyers, Earsman, Brownsto, Cushool, and Almy soils. Included areas make up about 20 percent of the total acreage.

The Torriorthents are shallow or moderately deep and are well drained. They formed in residuum and colluvium derived dominantly from sandstone, shale, and basalt. The surface is generally covered with stones. The surface layer is reddish brown. The soils range from loamy to clayey and have a variable content of gravel, cobbles, and stones.

Permeability is moderate in the Torriorthents. Available water capacity is low. The effective rooting depth is 4 to 40 inches. Runoff is rapid, and the hazard of water erosion is severe.

The Rock outcrop consists mainly of barren sandstone, shale, and basalt.

This unit is used as wildlife habitat. The native vegetation is grasses, forbs, pinyon, and Utah juniper.

This unit is poorly suited to homesite development. The main limitations are the slope, the depth to bedrock, and large stones.

This map unit is in capability class VIII. No range site is assigned.

106—Tridell-Brownsto stony sandy loams, 12 to 50 percent slopes, extremely stony. This map unit is on terraces and mountainsides. Elevation is 6,400 to 7,700 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 105 days.

This unit is about 45 percent Tridell soil and 35 percent Brownsto soil. About 5 to 10 percent of the surface is covered with stones.

Included in this unit are small areas of Forelle and Evanston soils in the less sloping cleared areas. Also included are small areas of basalt Rock outcrop and soils that are similar to the Tridell soil but have less gravel and fewer stones. Included areas make up about 20 percent of the total acreage.

The Tridell soil is deep and somewhat excessively drained. It formed in alluvium and colluvium derived dominantly from sandstone and basalt. Typically, the upper part of the surface layer is grayish brown stony sandy loam about 2 inches thick. The lower part is grayish brown very cobbly fine sandy loam about 7 inches thick. The upper 5 inches of the substratum is very cobbly fine sandy loam. The next part is cobbly sandy loam about 11 inches thick. Below this is 12 inches of very stony fine sandy loam. The lower part of the substratum to a depth of 60 inches is very stony loamy sand. Hard basalt is commonly below a depth of about 60 inches. The soil is calcareous throughout. A thin layer of partially decomposed needles, twigs, and leaves is on the surface in many places.

Permeability is moderately rapid in the Tridell soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

The Brownsto soil is deep and well drained. It formed in alluvium derived dominantly from coarse textured, calcareous sandstone and basalt. Typically, the upper part of the surface layer is light brownish gray stony sandy loam about 4 inches thick. The lower part is light brownish gray stony sandy loam about 7 inches thick. The upper 19 inches of the substratum is very gravelly sandy loam. The next 12 inches is very gravelly loamy sand. The lower part to a depth of 60 inches is gravelly sandy loam. A thin layer of partially decomposed needles, twigs, and leaves is on the surface in many places.

Permeability is moderate in the Brownsto soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used mainly for livestock grazing or wildlife habitat. It also is used for limited homesite development, for Christmas trees, or as a source of firewood and posts.

The potential plant community on the Tridell soil is mainly pinyon pine and Utah juniper with an understory of bluebunch wheatgrass, Indian ricegrass, Wyoming big sagebrush, and muttongrass. Other plants that characterize this site are bottlebrush squirreltail, antelope bitterbrush, and true mountainmahogany. The average annual production of air-dry vegetation is about 300 pounds per acre.

The potential plant community on the Brownsto soil is mainly Wyoming big sagebrush, needleandthread, Indian ricegrass, western wheatgrass, and scattered pinyon pine and Utah juniper. Other plants that characterize this site are bottlebrush squirreltail, antelope bitterbrush, and true mountainmahogany. The average annual production of native understory vegetation is about 600 pounds per acre.

If the range condition deteriorates, Wyoming big sagebrush, cheatgrass, and annual weeds increase in abundance. Mechanical treatment is not practical because of the very stony surface and the slope. Suitable management practices include proper grazing use and a planned grazing system. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. Selective thinning of the pinyon and juniper stands improves the quality of the understory for grazing and provides firewood, posts, and Christmas trees.

The Tridell soil is suited to limited production of pinyon pine and Utah juniper. The average annual production is 5 cords per acre. The average stocking rate is 150 trees per acre. To ensure sustained yields and continued use, the kind of wood production should be considered before the stands are thinned or cleared. Special care is needed to minimize erosion when the stands are thinned or cleared. Thinning the stands generally promotes the growth of understory grasses and young trees.

Only the less sloping areas of this unit are suited to homesite development. The main limitations are the slope and the stoniness. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Topsoil can be stockpiled and used to reclaim areas disturbed during

construction. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris. Population growth has resulted in increased construction of homes in areas of this unit.

This map unit is in capability subclass VIIe, nonirrigated. The Tridell soil is in the Pinyon-Juniper woodland site, and the Brownsto soil is in the Stony Foothills range site.

107—Uracca, moist-Mergel complex, 1 to 6 percent slopes, extremely stony. This map unit is on alluvial fans, benches, and valley side slopes. Elevation is 6,800 to 8,400 feet. The average annual precipitation is 16 to 19 inches, the average annual air temperature is 40 to 43 degrees F, and the average frost-free period is 75 to 95 days.

This unit is about 50 percent Uracca soil and 40 percent Mergel soil.

Included in this unit are small areas of soils that are similar to the Uracca and Mergel soils but have a thicker surface layer and a lower content of coarse fragments. Included areas make up about 10 percent of the total acreage.

The Uracca soil is deep and well drained. It formed in alluvium derived dominantly from mixed igneous and metamorphic material. About 3 to 15 percent of the surface is covered with boulders, stones, cobbles, and gravel. Typically, the surface layer is brown cobbly sandy loam about 3 inches thick. The upper 5 inches of the subsoil is cobbly sandy loam. The lower 7 inches is very cobbly sandy clay loam. The substratum to a depth of 60 inches or more is extremely cobbly loamy sand. The content of coarse fragments ranges from 35 to 85 percent, by volume, in a major part of the surface layer and subsoil.

Permeability is moderately rapid in the Uracca soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

The Mergel soil is deep and well drained. It formed in glacial outwash. About 3 to 30 percent of the surface is covered with boulders, stones, cobbles, and gravel. Typically, the surface layer is grayish brown cobbly loam about 8 inches thick. The upper 12 inches of the substratum is very cobbly sandy loam. The lower part to a depth of 60 inches is extremely stony sandy loam. The content of coarse fragments ranges from 35 to 80 percent, by volume.

Permeability is moderate in the Mergel soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for irrigated hay and pasture. It also is used for homesite development or rock quarrying.

If this unit is used for hay and pasture, the main limitation is the low available water capacity. Frequent irrigation is needed. Applications of nitrogen and phosphorus fertilizer improve the growth of forage plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion. Irrigation water can be applied by corrugation, sprinkler, and flooding methods. Pipe, ditch lining, or drop structures in irrigation ditches facilitate irrigation and reduce the hazard of ditch erosion. If properly managed, the unit can produce 4 tons of irrigated grass hay per acre annually.

If this unit is used for homesite development, the main limitations are the large stones and boulders on and below the surface. Population growth has resulted in increased construction of homes in areas of this unit. Preserving the existing plant cover during construction helps to control erosion. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. The effluent from septic tank absorption fields can surface in downslope areas and thus create a health hazard. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage from onsite sewage disposal systems. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris.

This map unit is in capability subclass VIs, irrigated and nonirrigated. It is in the Stony Loam range site.

108—Uracca, moist-Mergel complex, 6 to 12 percent slopes, extremely stony. This map unit is on alluvial fans and valley side slopes. Elevation is 6,800 to 8,400 feet. The average annual precipitation is 16 to 19 inches, the average annual air temperature is 40 to 43 degrees F, and the average frost-free period is 75 to 95 days.

This unit is about 50 percent Uracca soil and 40 percent Mergel soil.

Included in this unit are small areas of soils that are similar to the Uracca and Mergel soils but have a thicker surface layer and a lower content of coarse fragments. Included areas make up about 10 percent of the total acreage.

The Uracca soil is deep and well drained. It formed in alluvium derived dominantly from mixed igneous and

metamorphic material. About 3 to 15 percent of the surface is covered with boulders, stones, cobbles, and gravel. Typically, the surface layer is brown cobbly sandy loam about 3 inches thick. The upper 5 inches of the subsoil is cobbly sandy loam. The lower 7 inches is very cobbly sandy clay loam. The substratum to a depth of 60 inches or more is extremely cobbly loamy sand. The content of coarse fragments ranges from 35 to 85 percent, by volume, in a major part of the surface layer and subsoil.

Permeability is moderately rapid in the Uracca soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

The Mergel soil is deep and well drained. It formed in glacial outwash. About 3 to 30 percent of the surface is covered with boulders, stones, cobbles, and gravel. Typically, the surface layer is grayish brown cobbly loam about 8 inches thick. The upper 12 inches of the substratum is very cobbly sandy loam. The lower part to a depth of 60 inches is extremely stony sandy loam. The content of coarse fragments ranges from 35 to 80 percent, by volume.

Permeability is moderate in the Mergel soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for pasture or as rangeland. It also is used for homesite development or limited rock quarrying.

The potential plant community on this unit is mainly Letterman needlegrass, bluebunch wheatgrass, Indian ricegrass, Saskatoon serviceberry, and antelope bitterbrush. Other plants that characterize this site are western wheatgrass, mountain big sagebrush, and scattered Gambel oak. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, cheatgrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. The main limitations are the stones and boulders on the surface. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management. Because of the hazard of seepage, this unit is limited as a site for livestock watering ponds and other water impoundments.

If this unit is used for hay and pasture, the main limitation is the low available water capacity. Frequent irrigation is needed. Applications of nitrogen and phosphorus fertilizer improve the growth of forage plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and protect the soil from erosion. Irrigation water can be applied by corrugation, sprinkler, and flooding methods. Pipe, ditch lining, or drop structures in irrigation ditches facilitate irrigation and help to control erosion.

If this unit is used for homesite development, the main limitations are the large stones and boulders on and below the surface. Population growth has resulted in increased construction of homes in areas of this unit. Preserving the existing plant cover during construction helps to control erosion. The pebbles and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. The effluent from septic tank absorption fields can surface in downslope areas and thus create a health hazard. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage from onsite sewage disposal systems. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris.

This map unit is in capability subclass VIe, irrigated and nonirrigated. It is in the Stony Loam range site.

109—Uracca, moist-Mergel complex, 12 to 25 percent slopes, extremely stony. This map unit is on alluvial fans and valley side slopes. Elevation is 6,800 to 8,400 feet. The average annual precipitation is 16 to 19 inches, the average annual air temperature is 40 to 43 degrees F, and the average frost-free period is 75 to 95 days.

This unit is about 50 percent Uracca soil and 40 percent Mergel soil.

Included in this unit are small areas of soils that are similar to the Uracca and Mergel soils but have a thicker surface layer and a lower content of coarse fragments. Included areas make up about 10 percent of the total acreage.

The Uracca soil is deep and well drained. It formed in alluvium derived dominantly from mixed igneous and metamorphic material. About 3 to 15 percent of the surface is covered with boulders, stones, cobbles, and gravel. Typically, the surface layer is brown cobbly sandy loam about 2 inches thick. The upper 4 inches of the subsoil is cobbly sandy loam. The lower 6 inches is very cobbly sandy clay loam. The substratum to a depth of 60 inches or more is extremely cobbly loamy sand. The content of coarse fragments ranges from 35 to 85 percent, by volume, in a major part of the surface layer and subsoil.

Permeability is moderately rapid in the Uracca soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight or moderate.

The Mergel soil is deep and well drained. It formed in glacial outwash. About 3 to 30 percent of the surface is covered with boulders, stones, cobbles, and gravel. Typically, the surface layer is grayish brown cobbly loam about 7 inches thick. The upper 11 inches of the substratum is very cobbly sandy loam. The lower part to a depth of 60 inches is extremely stony sandy loam. The content of coarse fragments ranges from 35 to 80 percent, by volume.

Permeability is moderate in the Mergel soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly as rangeland. It also is used for limited homesite development or as wildlife habitat.

The potential plant community on this unit is mainly Letterman needlegrass, bluebunch wheatgrass, Indian ricegrass, Saskatoon serviceberry, and antelope bitterbrush. Other plants that characterize this site are western wheatgrass, mountain big sagebrush, and scattered Gambel oak. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, cheatgrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor. Mechanical treatment is not practical because of the surface stoniness. Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management.

If this unit is used for homesite development, the main limitations are large stones and boulders and the slope in the steeper areas. Population growth has resulted in increased construction of homes in areas of this unit. Preserving the existing plant cover during construction helps to control erosion. The gravel and cobbles in disturbed areas should be removed if the site is landscaped, particularly in areas used for lawns. The effluent from septic tank absorption fields can surface in downslope areas and thus create a health hazard. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage from onsite sewage disposal systems. The slope is a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour.

This map unit is in capability subclass VIe, nonirrigated. It is in the Stony Loam range site.

110—Uracca, moist-Mergel complex, 25 to 65 percent slopes, extremely stony. This map unit is on alluvial fans and valley side slopes. Elevation is 6,800 to 8,400 feet. The average annual precipitation is 16 to 19 inches, the average annual air temperature is 40 to 43 degrees F, and the average frost-free period is 75 to 95 days.

This unit is about 45 percent Uracca soil and 40 percent Mergel soil.

Included in this unit are small areas of soils that are similar to the Uracca and Mergel soils but have a thicker surface layer and a lower content of coarse fragments. Included areas make up about 15 percent of the total acreage.

The Uracca soil is deep and well drained. It formed in alluvium derived dominantly from mixed igneous and metamorphic material. About 3 to 15 percent of the surface is covered with boulders, stones, cobbles, and gravel. Typically, the surface layer is brown cobbly sandy loam about 2 inches thick. The upper 4 inches of the subsoil is cobbly sandy loam. The lower 6 inches is very cobbly sandy clay loam. The substratum to a depth of 60 inches or more is extremely cobbly loamy sand. The content of coarse fragments ranges from 35 to 85 percent, by volume, in a major part of the surface layer and subsoil.

Permeability is moderately rapid in the Uracca soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

The Mergel soil is deep and well drained. It formed in glacial outwash. About 3 to 30 percent of the surface is covered with boulders, stones, cobbles, and gravel. Typically, the surface layer is grayish brown cobbly loam about 7 inches thick. The upper 11 inches of the substratum is very cobbly sandy loam. The lower part to a depth of 60 inches is extremely stony sandy loam. The content of coarse fragments ranges from 35 to 80 percent, by volume.

Permeability is moderate in the Mergel soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly as rangeland. It also is used as wildlife habitat.

The potential plant community on this unit is mainly Letterman needlegrass, bluebunch wheatgrass, Indian ricegrass, Saskatoon serviceberry, and antelope bitterbrush. Other plants that characterize this site are western wheatgrass, mountain big sagebrush, and scattered Gambel oak. The average annual production of air-dry vegetation is about 1,200 pounds per acre. If the range condition deteriorates, mountain big sagebrush, Kentucky bluegrass, cheatgrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is poor.

Mechanical treatment is not practical because of the slope and the stones on the surface. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

In the more sloping areas, these soils are severely limited as sites for all types of urban and homesite development.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Stony Loam range site.

111—Vandamore channery sandy loam, 25 to 65 percent slopes. This moderately deep, well drained soil is on mountainsides. It formed in residuum and colluvium derived dominantly from sandstone. Elevation is 8,000 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 38 to 42 degrees F, and the average frost-free period is 55 to 65 days.

About 5 to 15 percent of the surface is covered with channery fragments. Typically, the surface layer is grayish brown channery sandy loam about 2 inches thick. The next 5 inches is channery sandy loam. The upper 6 inches of the substratum is very channery loam. The lower part is very channery fine sandy loam. Sandstone bedrock is at a depth of about 27 inches.

Included in this unit are small areas of Starley soils. Also included are small areas of soils that are similar to the Vandamore soil but are more than 40 inches deep over sandstone bedrock. Included areas make up about 20 percent of the total acreage.

Permeability is moderately rapid in the Vandamore soil. Available water capacity is very low. The effective rooting depth is 20 to 30 inches. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly bluebunch wheatgrass, western wheatgrass, prairie junegrass, Indian ricegrass, true mountainmahogany, antelope bitterbrush, Saskatoon serviceberry, and big sagebrush. The average annual production of air-dry vegetation is about 900 pounds per acre.

Suitable management practices include proper range use, deferred grazing, and rotation grazing. Aerial spraying is suitable for brush management. Mechanical treatment is not practical because of the slope and the stones on the surface. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas.

This unit is poorly suited to homesite development. The main limitations are the slope and the depth to bedrock.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Loamy Slopes range site.

112—Woodhall gravelly loam, 6 to 50 percent slopes, extremely stony. This moderately deep, well drained soil is on mountainsides and ridges. It formed in residuum and alluvium derived dominantly from noncalcareous sandstone and basalt. Elevation is 8,500 to 9,500 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 38 to 40 degrees F, and the average frost-free period is 60 to 75 days.

About 5 to 10 percent of the surface is covered with stones, and 15 to 30 percent is covered with gravel. Typically, the upper part of the surface layer is brown gravelly loam about 5 inches thick. The lower part is very gravelly loam about 8 inches thick. The subsoil is extremely cobbly clay loam about 12 inches thick. Hard sandstone is at a depth of about 25 inches.

Included in this unit are small areas of soils that are similar to the Woodhall soil but have a thicker surface layer and a finer textured subsoil. Also included are small areas of sandstone Rock outcrop and Ansel and Anvik soils. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Woodhall soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland, woodland, or wildlife habitat. The potential plant community is mainly Douglas fir with an understory of bluegrasses, wheatgrasses, mountain snowberry, and wax currant. Other plants that characterize this site are herbaceous cinquefoil, antelope bitterbrush, true mountainmahogany, common juniper, and Oregongrape. The potential production of the native understory vegetation in normal years is about 400 pounds of air-dry vegetation per acre.

If this unit is used as rangeland, the main limitations are the stones on the surface, dense stands of trees, and the slope in the steeper areas. Suitable management practices include proper range use, deferred grazing, and rotation grazing.

The site index for Douglas fir on this unit is 48.

If this unit is used for homesite development, the main limitations are the large stones, the depth to bedrock, and the slope in the steeper areas. The high content of rock fragments makes excavation difficult. The deep cuts needed to provide essentially level building sites can expose the bedrock. The slope is a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour. The effluent from septic tank absorption fields can surface in downslope areas and thus create a health hazard. Access roads should be designed to

control surface runoff and help stabilize cut slopes.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Douglas Fir woodland site.

113—Woosley loam, 3 to 30 percent slopes. This moderately deep, well drained soil is on mountain benches. It formed in material weathered from sandstone. Elevation is 7,800 to 8,700 feet. The average annual precipitation is about 15 to 18 inches, the average annual air temperature is 40 to 42 degrees F, and the average frost-free period is 60 to 80 days.

Typically, the surface layer is brown loam about 4 inches thick. The upper 6 inches of the subsoil is brown clay loam. The lower 15 inches is strong brown clay loam. Hard, sandstone bedrock is at a depth of about 25 inches. The depth to bedrock ranges from 20 to 40 inches.

Included in this unit are small areas of soils that are similar to the Woosley soil but do not have bedrock within a depth of 40 inches. Included areas make up about 10 percent of the total acreage.

Permeability is moderate in the Woosley soil. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or severe.

This unit is used for livestock grazing or wildlife habitat. The potential plant community is mainly bluebunch wheatgrass, Letterman needlegrass, wheatgrass, sheep fescue, and Wyoming big sagebrush. Other plants that characterize this site are bluegrass, prairie junegrass, Indian ricegrass, bottlebrush squirreltail, and serviceberry. The average annual production of air-dry vegetation is about 750 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush and annual weeds increase in abundance.

If the quality of range vegetation has seriously deteriorated, seeding is needed. Seeding is difficult on slopes of more than 15 percent. For successful seeding, a seedbed should be prepared and the seed drilled. In areas where brush is removed by prescribed burning or by chemical or mechanical means, the hazard of erosion may increase. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

If this unit is used for homesite development, the main limitations are the depth to bedrock and the restricted permeability. Excavation of building sites is limited by the bedrock. Septic tank absorption fields of conventional size do not function properly because of the restricted permeability. Using sandy backfill for the trench and establishing long absorption lines help to overcome the restricted permeability.

This map unit is in capability subclass VIe, nonirrigated. It is in the Dry Mountain Loam range site.

114—Yamo loam, 1 to 6 percent slopes. This deep, well drained soil is on fans and toe slopes. It formed in colluvium derived dominantly from sandstone, shale, and gypsum. Elevation is 6,200 to 7,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is light brownish gray loam about 8 inches thick. The subsoil is loam about 6 inches thick. The substratum to a depth of 60 inches or more is loam. Thin strata of material that ranges from gravelly clay loam to sand are common below a depth of 40 inches.

Included in this unit are small areas of Forelle and Mussel soils and areas of Gypsiorthids. Also included are small areas of soils that are similar to the Yamo soil but have a more alkaline subsoil and support greasewood vegetation. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Yamo soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for rangeland, hay, pasture, or irrigated crops. It also is used for homesite development.

The potential plant community on this unit is mainly western wheatgrass, bluebunch wheatgrass, Indian ricegrass, prairie junegrass, Wyoming big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are needleandthread, bottlebrush squirreltail, and Sandberg bluegrass. The average annual production of air-dry vegetation is about 800 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

If the quality of range vegetation has seriously deteriorated, seeding is needed. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. For successful seeding, a seedbed should be prepared and the seed drilled.

This unit is well suited to hay and pasture. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage. Irrigation water can be applied by corrugation and sprinkler methods. Leveling helps to ensure the uniform application of water. In some places sinkholes or pipes may develop because of the content of gypsum in the soil. If properly managed, the unit can produce 4 tons of

irrigated grass hay per acre annually.

This unit is well suited to irrigated crops. It is limited mainly by content of gypsum and the susceptibility to piping and sinkholes. Sprinkler irrigation can be used, but water should be applied slowly to minimize runoff. Pipe, ditch lining, or drop structures in irrigation ditches facilitate irrigation and help to control erosion. Returning crop residue to the soil or regularly adding other organic material improves fertility, reduces crusting, and increases the water intake rate. Crops respond well to applications of nitrogen and phosphorus fertilizer. Crops suitable for this soil include alfalfa and small grains.

This unit is suited to homesite development. The shrink-swell potential is a limitation. It can be minimized by prewetting the foundation area. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris. Population growth has resulted in increased construction of homes in areas of this soil.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Rolling Loam range site.

115—Yamo loam, 6 to 12 percent slopes. This deep, well drained soil is on fans and toe slopes. It formed in colluvium derived dominantly from sandstone, shale, and gypsum. Elevation is 6,200 to 7,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is light brownish gray loam about 8 inches thick. The subsoil is loam about 6 inches thick. The substratum to a depth of 60 inches or more is loam. Thin strata of material that ranges from gravelly clay loam to sand are common below a depth of 40 inches.

Included in this unit are small areas of Forelle and Mussel soils and small areas of Gypsiorthids. Also included are small areas of soils that are similar to the Yamo soil but have a more alkaline subsoil and support some greasewood vegetation. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Yamo soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used mainly as rangeland, hayland, or pasture. It also is used for homesite development.

The potential plant community on this unit is mainly western wheatgrass, bluebunch wheatgrass, Indian ricegrass, prairie junegrass, Wyoming big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are needleandthread, bottlebrush squirreltail, and Sandberg bluegrass. The average annual production of air-dry vegetation is about 800 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

Range seeding may be needed if the range is in poor condition. For successful seeding, a seedbed should be prepared and the seed drilled. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both.

This unit is suited to homesite development. The main limitation is the slope in the steeper areas. The shrink-swell potential is also a limitation. It can be minimized by prewetting the foundation area. Areas adjacent to hillsides are occasionally affected by runoff, which may be accompanied by the movement of rock debris.

This map unit is in capability subclass IVe, irrigated and nonirrigated. It is in the Rolling Loam range site.

116—Yamo loam, 12 to 25 percent slopes. This deep, well drained soil is on fans and toe slopes. It formed in colluvium derived dominantly from sandstone, shale, and gypsum. Elevation is 6,200 to 7,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is light brownish gray loam about 8 inches thick. The subsoil is loam about 6 inches thick. The substratum to a depth of 60 inches or more is loam. Thin strata of material that ranges from gravelly clay loam to sand are common below a depth of 40 inches.

Included in this unit are small areas of Mussel soils and Gypsiorthids. Also included are small areas of Forelle soils. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Yamo soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used as rangeland. The potential plant community is mainly western wheatgrass, bluebunch wheatgrass, Indian ricegrass, prairie junegrass, Wyoming big sagebrush, and Douglas rabbitbrush. Other plants that characterize this site are needleandthread, bottlebrush squirreltail, Sandberg bluegrass, Utah juniper, and Rocky Mountain juniper. The average annual production of air-dry vegetation is about 800 pounds per acre. If the range condition deteriorates, Wyoming big sagebrush, Douglas rabbitbrush, cheatgrass, and annual weeds increase in abundance.

The suitability of this unit for range seeding is fair. The main limitations are the slope and occasional gypsum outcrops.

If this unit is used for homesite development, the main limitation is the slope.

This map unit is in capability subclass VIe, nonirrigated. It is in the Rolling Loam range site.

117—Yeljack-Callings complex, 12 to 25 percent slopes. This map unit is on ridgetops, benches, and mountainsides. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 39 to 41 degrees F, and the average frost-free period is 70 to 80 days.

This unit is about 50 percent Yeljack soil and 40 percent Callings soil.

Included in this unit are small areas of Mine, Arle, Ansari, Jerry, Millerlake, Uracca, and Mergel soils. Included areas make up about 10 percent of the total acreage.

The Yeljack soil is deep and well drained. It formed in alluvium derived dominantly from sandstone and loess. Typically, the upper 10 inches of the surface layer is dark brown silt loam. The lower 14 inches is silty clay loam. The subsurface layer is clay loam about 8 inches thick. The subsoil to a depth of 60 inches or more is clay loam.

Permeability is moderately slow in the Yeljack soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

The Callings soil is deep and well drained. It formed in alluvium and colluvium derived dominantly from sandstone. Typically, the upper part of the surface layer is dark brown loam about 6 inches thick. The lower 6 inches is gravelly loam. The subsurface layer is very cobbly clay loam about 11 inches thick. The upper 11 inches of the subsoil is very cobbly clay loam. The lower 19 inches is very gravelly clay loam. The substratum to a depth of 60 inches or more is very cobbly sandy clay loam.

Permeability is slow in the Callings soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat.

The potential plant community on the Yeljack soil is mainly Arizona fescue, slender wheatgrass, and mountain brome. Other plants that characterize this site are Letterman needlegrass and pine needlegrass. The average annual production of air-dry vegetation is about 1,500 pounds per acre. If the range condition deteriorates, tall rabbitbrush and phlox increase in abundance. If the condition of the range further deteriorates, Kentucky bluegrass increases in abundance.

The potential plant community on the Callings soil is mainly mountain brome, elk sedge, big bluegrass, and Gambel oak. Saskatoon serviceberry and mountain snowberry also are included. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range condition deteriorates, rabbitbrush, cheatgrass, and Canada thistle increase in abundance. Range seeding may be needed if the range is in poor condition.

If this unit is used for homesite development, the main limitations are a moderate shrink-swell potential, low soil strength, the restricted permeability, and the depth to stones, sand, and gravel. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage from onsite sewage disposal systems. Absorption lines should be placed below the slowly permeable layer. Increasing the size of the absorption areas helps to overcome the restricted permeability. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

This map unit is in capability subclass VIe, nonirrigated. The Yeljack soil is in the Mountain Loam range site, and the Callings soil is in the Brushy Loam range site.

118—Youga loam, 12 to 30 percent slopes. This deep, well drained soil is on upland hills and mountainsides. It formed in alluvium and colluvium derived dominantly from basalt. Elevation is 7,800 to 9,000 feet. The average annual precipitation is 19 to 21 inches, the average annual air temperature is 36 to 38 degrees F, and the average frost-free period is 85 to 95 days.

Typically, the surface layer is very dark brown loam about 4 inches thick. The upper 8 inches of the subsoil is loam. The lower 16 inches is clay loam. The next layer is gravelly sandy clay loam about 8 inches thick. The upper 12 inches of the substratum is gravelly sandy clay loam. The lower part to a depth of 60 inches or more is gravelly clay loam.

Included in this unit are small areas of Jerry, Cochetopa, and Forsey soils. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Youga soil. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used as rangeland. The potential plant community is mainly Thurber fescue, nodding brome, bearded wheatgrass, Idaho fescue, and mountain snowberry. Other plants that characterize this site are Letterman needlegrass, cinquefoil, and western yarrow.

The average annual production of air-dry vegetation is about 2,800 pounds per acre. If the range condition deteriorates, Kentucky bluegrass, mountain dandelion, cinquefoil, and western yarrow increase in abundance.

Range seeding may be needed if the range is in poor condition. The main limitations are the slope and stones in some areas.

If this unit is used for homesite development, the main limitation is the slope. The shrink-swell potential is also a limitation. It can be minimized by prewetting foundation areas. The slope is a management concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour. The restricted permeability can be overcome by increasing the size of the absorption field.

This map unit is in capability subclass VIe, nonirrigated. It is in the Subalpine Loam range site.

119—Zillman very flaggy loam, 25 to 65 percent slopes. This deep, well drained soil is on mountainsides. It formed in colluvium and residuum derived dominantly from sandstone. Elevation is 6,400 to 7,800 feet. The average annual precipitation is 13 to 15 inches, the average annual air temperature is 40 to 41 degrees F, and the average frost-free period is 80 to 100 days.

About 5 percent of the surface is covered with channery fragments, and 10 percent is covered with flagstones. Typically, the upper part of the surface layer is dark grayish brown very flaggy loam about 5 inches thick. The lower part is dark grayish brown channery fine sandy loam about 7 inches thick. The subsoil is grayish brown very channery clay loam about 12 inches thick. The upper 21 inches of the substratum is light brownish gray and grayish brown very channery clay loam. The lower part to a depth of 60 inches is light olive gray very channery loam.

Included in this unit are small areas of soils that are similar to the Zillman soil but are moderately deep over bedrock. They are on convex slopes. Also included are small areas of Jerry soils in concave, shady positions. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Zillman soil. Available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used as rangeland or as wildlife habitat. The potential plant community is mainly bluebunch wheatgrass, muttongrass, Sandberg bluegrass, mountain big sagebrush, Utah serviceberry, and true mountainmahogany. Other plants that characterize this site are Indian ricegrass, mountain snowberry, and scattered pinyon pine, Rocky Mountain juniper, and Gambel oak. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range condition deteriorates, mountain big sagebrush, cheatgrass, Douglas rabbitbrush, and annual weeds increase in abundance. These plants are dominant when the range is in poor condition; therefore, livestock grazing should be managed so that the desired balance of the preferred species is maintained.

The suitability of this soil for range seeding is poor. The main limitations are the slope and the surface stoniness. The slope limits access by livestock. The limited accessibility results in overgrazing of the less sloping areas. In areas where brush is removed by prescribed burning or by chemical or mechanical means, the hazard of erosion may increase.

This unit is poorly suited to homesite development. The main limitation is the slope.

This map unit is in capability subclass VIIe, nonirrigated. It is in the Loamy Slopes range site.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 21,504 acres in the survey area, or nearly 3 percent of the total acreage, meets the soil requirements for prime farmland if an adequate and dependable supply of irrigation water is available.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed at the end of this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

The map units that in irrigable areas meet the requirements for prime farmland are:

6	Almy loam, 1 to 12 percent slopes (where slopes are less than 6 percent)
34	Empedrado loam, 2 to 6 percent slopes
38	Evanston loam, 1 to 6 percent slopes
49	Goslin fine sandy loam, 3 to 6 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Stanley Woodyard, district conservationist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Approximately 31,820 acres in the survey area is used for irrigated crops, pasture, or hayland or for nonirrigated crops. About 4,500 acres is used for irrigated crops, 10,400 acres for irrigated pasture and hay, and 7,920 acres for nonirrigated crops.

Nonirrigated crop production is difficult, and its success depends on the amount of precipitation received. Summer fallowing, which allows the soil to store water for the following year's crop, is necessary. Wind erosion is not a major problem in the survey area, but a conservation tillage system that leaves crop residue on the surface and permits the water to penetrate the soil is advisable.

Sweep or rod weeders cut weeds below the surface and still keep debris on the surface. Tillage should be kept to a minimum. Chemical fallow is new to the area and is being tried on only a small acreage.

Tilling and planting on the contour or parallel to the slope help to control water erosion. Water from snowmelt may cause erosion on the steeper slopes. Approximately 50 percent of the moisture between November 15 and April 15 is received in the form of snow. Early frost in the fall and late frost in the spring often reduce crop yields. Snow mold is a common problem for winter wheat.

Most of the soils used for nonirrigated crops are loam or clay loam. Slopes range from 2 to 9 percent.

The irrigated cropland in the survey area is subject to water erosion. Other concerns relative to irrigation management include the length of runs, the amount of water per furrow, frequency of irrigation, water storage methods, and the slope.

The amount of pipe used in canal systems and on farms has increased in recent years. This increase in the extent of irrigation has helped to control erosion in the area. Corrugation is presently the most common method of irrigation in the survey area. The corrugations should be placed on a suitable grade. Sprinkler methods of irrigation are relatively new to the area, but interest in gravity flow sprinklers as a means of conserving water and reducing the hazard of erosion has increased.

The choice of crops is limited because of insufficient water storage, the slope, elevation, and the short growing season. Small grains, corn for silage, and potatoes are the most common cash crops.

The irrigated land in the survey area is commonly used for pasture and hay. The lack of adequate water storage can reduce production. Close-growing crops are suitable in the steeper areas and at the higher elevations as well as on the more gentle slopes at the lower elevations. Two cuttings are common in the lower areas, and one cutting is common at the higher elevations. Livestock are often allowed to graze the hayland in early spring and late fall. Important management practices include timely application of irrigation water, applications of fertilizer, cross fencing, and deferred grazing.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops *(5)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Rangeland and Woodland Understory

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 6 shows, for nearly all of the soils, the range or woodland site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland or are suited to use as rangeland are listed. An explanation of the column headings in table 6 follows.

A *range or woodland site* is a distinctive area that produces a characteristic natural plant community that differs from natural plant communities on other range or woodland sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was ascertained during this survey; thus, range or woodland sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important.

Total production is the amount of vegetation that can be expected to grow annually on well managed rangeland or woodland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation—the grasses, forbs, shrubs, and other plants that make up most of the potential natural plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition (fig. 8). Range condition is an ecological rating only.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Woodland Management and Productivity

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops.

Figure 8.—An area of Acree loam, 6 to 12 percent slopes, which is in the Mountain Loam range site. The range is in fair condition.

Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are the depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best

soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Edward L. Neilson, biologist, Soil Conservation Service, helped prepare this section.

The survey area exhibits a wide array of wildlife species. Rapid changes in elevation and aspect account for the extreme variations in habitat that occur in the area. For example, habitat can change from river bottom land to spruce-fir forests within a very short distance. These changes contribute in part to the diverse fauna in the area. Prominent wildlife species include elk, mule deer, black bear, mountain lion, beaver, muskrat, coyote, bobcat, raccoon, porcupine, Nuttall's cottontail, snowshoe hare, blue grouse, Canada geese, and ducks. Migratory species, such as mourning doves, a few species of hummingbirds, and various raptors, including the northern bald eagle, are also in the survey area at various times of the year.

Like most of western Colorado, the survey area provides important habitat for populations of elk and deer. Conflict between these species and developers in the area is a continuing problem. New roads, subdivisions, and other developments have interfered with and damaged vital migration routes and winter range. During severe winters deer and elk can cause considerable damage to crops and haystacks, and in some cases this damage can be attributed to the decrease in the amount of available winter forage. If wildlife species in the survey area are to continue to flourish, management of wildlife habitat is essential.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface

stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountainmahogany, bitterbrush, snowberry, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to

bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreation uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations

are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil

material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less

than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The

sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very

high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate

(high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16. An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. Only saturated zones within a depth of about 6 feet are indicated.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(6).* Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol.* An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. The adjective *Fluvaquentic* identifies the subgroup of extragrades that have an irregular decrease in content of organic carbon with increasing depth. An example is Fluvaquentic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy over sandy or sandy-skeletal, mixed (calcareous), frigid Fluvaquentic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (4).* Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (6).* Unless otherwise stated, matrix colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Acree Series

The Acree series consists of deep, well drained soils on alluvial fans and valley side slopes. These soils formed in alluvium and residuum derived dominantly from redbed sandstone and shale. Slope is 3 to 25 percent. The average annual precipitation is 16 to 18 inches, and the average annual air temperature is 38 to 42 degrees F.

These soils are fine, montmorillonitic Typic Argiborolls.

Typical pedon of Acree loam, 3 to 6 percent slopes, about 2,600 feet north and 1,900 feet east of the southwest corner of sec. 11, T. 7 S., R. 87 W.

A—0 to 10 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few scattered pebbles; neutral; gradual smooth boundary.

BA—10 to 14 inches; brown (7.5YR 5/2) clay loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; slightly hard, very friable, sticky and plastic; few thin clay films on peds; about 5 percent gravel; neutral; clear smooth boundary.

Bt—14 to 27 inches; reddish brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist; moderate medium angular blocky structure parting to moderate fine angular blocky; hard, firm, sticky and very plastic; thin continuous clay films on peds and on the inside of root channels and pores; about 5 percent gravel; mildly alkaline; clear wavy boundary.

BCk—27 to 34 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium angular blocky structure; hard, firm, sticky and very plastic; common thin clay films on peds; about 10 percent cobbles; secondary calcium carbonate occurring as soft nodules; calcareous; moderately alkaline; gradual wavy boundary.

Ck—34 to 60 inches; light reddish brown (5YR 6/4) clay loam, reddish brown (5YR 5/4) moist; massive; very hard, firm, sticky and very plastic; about 10 percent cobbles; secondary calcium carbonate occurring as soft nodules and in thin seams and streaks; the content of visible carbonate decreasing with increasing depth; calcareous; moderately alkaline.

The mollic epipedon is 8 to 16 inches thick. Lime is at a depth of 12 to 40 inches. The particle-size control section is 0 to 35 percent rock fragments.

The Bt horizon has hue of 5YR to 10R. The content of clay in this horizon is 35 to 50 percent. Reaction is neutral or mildly alkaline.

Almy Series

The Almy series consists of deep, well drained soils on fans and uplands. These soils formed in alluvium derived dominantly from calcareous redbed sandstone and shale. Slope is 1 to 25 percent. The average annual precipitation is 12 to 14 inches, and the average annual air temperature is 42 to 46 degrees F.

These soils are fine-loamy, mixed Borollic Haplargids.

Typical pedon of Almy loam, 1 to 12 percent slopes, about 2,000 feet south and 1,800 feet west of the northeast corner of sec. 15, T. 5 S., R. 86 W.

A1—0 to 3 inches; reddish brown (5YR 5/4) loam, dark reddish brown (5YR 3/2) moist; moderate fine granular structure; slightly hard, friable, nonsticky and nonplastic; mildly alkaline; clear smooth boundary.

A2—3 to 8 inches; reddish brown (5YR 5/4) loam, dark reddish brown (5YR 3/3) moist; moderate fine granular structure; slightly hard, friable, nonsticky and nonplastic; mildly alkaline; clear smooth boundary.

BA—8 to 11 inches; reddish brown (5YR 5/4) fine sandy loam, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; moderately alkaline; clear smooth boundary.

Btk—11 to 26 inches; reddish brown (2.5YR 5/4) sandy clay loam, reddish brown (2.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; secondary calcium carbonate occurring as thin seams; calcareous; moderately alkaline; clear smooth boundary.

Bk—26 to 60 inches; reddish brown (5YR 5/4) fine sandy loam, reddish brown (5YR 4/4) moist; massive; hard, friable, nonsticky and nonplastic; calcium carbonate occurring as thin seams and soft masses; calcareous; moderately alkaline.

Secondary lime is at a depth of 10 to 15 inches. The solum is 15 to 26 inches thick. The content of rock fragments is 0 to 15 percent.

The A horizon has hue of 10YR to 5YR. The Bt horizon has hue of 5YR or 2.5YR. The Bk horizon has hue of 7.5YR or 5YR.

Ansari Series

The Ansari series consists of shallow, well drained soils on ridges. These soils formed in residuum derived dominantly from redbed sandstone and shale. Slope is

12 to 50 percent. The average annual precipitation is 16 to 18 inches, and the average annual air temperature is 42 to 45 degrees F.

These soils are loamy, mixed Lithic Haploborolls.

Typical pedon of Ansari loam, in an area of Arle-Ansari-Rock outcrop complex, 12 to 50 percent slopes; about 500 feet south and 1,500 feet west of the northeast corner of sec. 33, T. 6 S., R. 87 W.

A—0 to 8 inches; reddish brown (5YR 5/3) loam, dark reddish brown (5YR 3/3) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; about 10 percent flagstones; calcareous; moderately alkaline; gradual wavy boundary.

Ck—8 to 14 inches; reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; about 10 percent flagstones; accumulation of calcium carbonate occurring as soft masses and as coatings on rock fragments; calcareous; moderately alkaline; abrupt wavy boundary.

R—14 inches; hard, reddish brown, calcareous sandstone.

Bedrock is at a depth of 10 to 20 inches. The content of rock fragments is 0 to 35 percent. These fragments are mainly flagstones more than 10 inches in diameter. Hue ranges from 5YR to 10R. The mollic epipedon is 7 to 16 inches thick. The fine-earth fraction of the control section is loam.

Ansel Series

The Ansel series consists of deep, well drained soils on fans and foot slopes. These soils formed in mixed alluvium. Slope is 12 to 45 percent. The average annual precipitation is 18 to 22 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are fine-loamy, mixed Typic Cryoboralfs.

Typical pedon of Ansel loam, in an area of Ansel-Anvik association, 25 to 45 percent slopes, about 2,000 feet north and 2,200 feet west of the southeast corner of sec. 14, T. 5 S., R. 83 W.

O—2 inches to 0; pine needles and twigs.

E—0 to 23 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; slightly acid; clear smooth boundary.

Bt—23 to 48 inches; brown (10YR 5/3) stony clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; about 20 percent stones; slightly acid; gradual wavy boundary.

BCt—48 to 60 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; slightly acid.

These soils are noncalcareous throughout. The content of rock fragments is 0 to 35 percent. Reaction is slightly acid or neutral.

The Bt horizon has hue of 10YR or 7.5YR. It is stony clay loam or stony sandy clay loam. The content of clay in this horizon is 22 to 35 percent.

Antrobus Series

The Antrobus series consists of deep, well drained soils on alluvial fans and mountainsides. These soils formed in alluvium and colluvium derived dominantly from basalt. Slope is 10 to 50 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 36 to 38 degrees F.

These soils are loamy-skeletal, mixed Typic Cryoborolls.

Typical pedon of Antrobus very stony loam, in an area of Cochetopa-Antrobus association, 25 to 50 percent slopes; 1,000 feet east and 2,300 feet north of the southwest corner of sec. 7, T. 7 S., R. 87 W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) very stony loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; about 40 percent basalt stones; many dark mineral grains in the sand and silt fractions; calcareous; moderately alkaline; clear wavy boundary.

AC—8 to 13 inches; brown (7.5YR 5/2) very stony loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; about 50 percent basalt stones; many dark mineral grains in the sand and silt fractions; calcareous; moderately alkaline; diffuse wavy boundary.

C—13 to 60 inches; brown (7.5YR 5/2) extremely stony loam, dark brown (7.5YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; about 65 percent basalt stones; many dark mineral grains in the sand and silt fractions; calcareous; moderately alkaline.

The mollic epipedon is 7 to 16 inches thick. Lime is at a depth of 1 to 2 inches. The control section is 35 to 80 percent rock fragments. The content of clay in the control section is 20 to 35 percent. The A and C horizons have hue of 2.5Y to 7.5YR.

Anvik Series

The Anvik series consists of deep, well drained soils on alluvial fans and mountain side slopes. These soils formed in mixed alluvium and colluvium. Slope is 10 to 50 percent. The average annual precipitation is 18 to 22 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are fine-loamy, mixed Boralfic Cryoborolls.

Typical pedon of Anvik loam, in an area of Anvik-Skylick-Sligting association, 25 to 50 percent slopes; about 1,500 feet north and 1,200 feet west of the southeast corner of sec. 1, T. 10 S., R. 86 W.

Oi—3 inches to 1 inch; undecomposed leaves and twigs.

Oe—1 inch to 0; decomposed organic material.

A—0 to 12 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine crumb structure; soft, very friable, nonsticky and nonplastic; about 10 percent cobbles; neutral; abrupt wavy boundary.

E—12 to 18 inches; light gray (10YR 7/2) loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; about 15 percent gravel and cobbles; neutral; gradual wavy boundary.

B/E—18 to 22 inches; grayish brown (10YR 5/2) cobbly clay loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; thin patchy clay films on peds; about 5 percent gravel and 15 percent cobbles; slightly acid; gradual wavy boundary.

Bt—22 to 38 inches; brown (10YR 5/3) cobbly clay loam, brown (10YR 4/3) moist; strong medium and fine subangular blocky structure; very hard, firm, sticky and plastic; thin continuous clay films on peds; about 20 percent cobbles; slightly acid; gradual wavy boundary.

BC—38 to 42 inches; grayish brown (10YR 5/2) cobbly clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; about 5 percent gravel and 15 percent cobbles; slightly acid; clear wavy boundary.

C—42 to 60 inches; grayish brown (10YR 5/2) cobbly clay loam, dark grayish brown (10YR 4/2) moist; massive; hard, firm, sticky and plastic; about 10 percent gravel and 15 percent cobbles; slightly acid.

These soils are noncalcareous to a depth of 60 inches. The content of rock fragments is 0 to 35 percent. These fragments are dominantly more than 3 inches in diameter. Hue is 2.5Y to 7.5YR. Reaction is slightly acid to mildly alkaline.

Arle Series

The Arle series consists of moderately deep, well drained soils on mountains and ridges. These soils formed in residuum derived dominantly from redbed shale and sandstone. Slope is 12 to 50 percent. The average annual precipitation is 16 to 18 inches, and the average annual air temperature is 42 to 45 degrees F.

These soils are loamy-skeletal, mixed Aridic Haploborolls.

Typical pedon of Arle very stony loam, in an area of Arle-Ansari-Rock outcrop complex, 12 to 50 percent slopes; 1,200 feet east and 200 feet north of the center of sec. 33, T. 6 S., R. 87 W.

A—0 to 10 inches; reddish brown (5YR 4/3) very stony loam, dark reddish brown (5YR 3/3) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; about 40 percent flagstones; mildly alkaline; gradual smooth boundary.

Bw—10 to 18 inches; reddish brown (2.5YR 4/4) very stony loam, dark reddish brown (2.5YR 3/4) moist; moderate medium subangular blocky structure parting to moderate medium granular; slightly hard, very friable, slightly sticky and slightly plastic; about 50 percent flagstones; calcareous; moderately alkaline; clear wavy boundary.

Ck—18 to 30 inches; reddish brown (2.5YR 5/4) very stony loam, reddish brown (2.5YR 4/4) moist; massive; hard, very friable, sticky and slightly plastic; about 50 percent flagstones; secondary calcium carbonate occurring as soft masses and as coatings on rock fragments; calcareous; moderately alkaline; clear wavy boundary.

Cr—30 to 60 inches; soft, reddish brown sandstone and shale.

Paralithic contact is at a depth of 20 to 40 inches. These soils are typically calcareous throughout, but they are leached of calcium carbonate to a depth of 7 to 15 inches in some pedons. The content of rock fragments ranges from 35 to 80 percent. These are mainly channery fragments and flagstones.

The A and Bw horizons have hue of 2.5YR or 5YR. The Ck horizon has hue of 5YR to 10R.

Atencio Series

The Atencio series consists of deep, well drained soils on fans and terraces. These soils formed in alluvium derived dominantly from sandstone and shale.

Slope is 3 to 6 percent. The average annual precipitation is 15 to 18 inches, and the average annual air temperature is 44 to 46 degrees F.

These soils are fine-loamy over sandy or sandy-skeletal, mixed, mesic Aridic Argiustolls.

Typical pedon of Atencio sandy loam, in an area of Atencio-Azeltine complex, 3 to 6 percent slopes; at the northwest corner of sec. 34, T. 7 S., R. 88 W.

A—0 to 6 inches; reddish gray (5YR 5/2) sandy loam, dark reddish brown (5YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; about 10 percent gravel; mildly alkaline; clear smooth boundary.

BA—6 to 10 inches; reddish brown (5YR 5/3) sandy loam, dark reddish brown (5YR 3/3) moist; weak medium subangular blocky structure parting to moderate medium granular; hard, very friable, slightly sticky and slightly plastic; about 10 percent gravel; mildly alkaline; clear wavy boundary.

Bt—10 to 20 inches; reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; many thin clay films on faces of peds; about 10 percent gravel; mildly alkaline; clear wavy boundary.

BCk—20 to 24 inches; reddish brown (5YR 5/4) gravelly sandy loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few thin clay films on peds; about 15 percent gravel; some secondary calcium carbonate occurring as soft masses and as coatings on pebbles; calcareous; moderately alkaline; gradual wavy boundary.

Ck1—24 to 30 inches; light reddish brown (5YR 6/3) gravelly sandy loam, reddish brown (5YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; about 15 percent gravel; some calcium carbonate occurring as soft masses and as coatings on pebbles; calcareous; moderately alkaline; diffuse wavy boundary.

2Ck2—30 to 60 inches; pinkish white (7.5YR 8/2) very gravelly sand, pink (7.5YR 7/4) moist; about 40 percent coarse gravel and 20 percent cobbles; some calcium carbonate occurring as coatings on pebbles; calcareous; moderately alkaline.

The mollic epipedon is 9 to 15 inches thick. Lime is at a depth of 10 to 17 inches. The depth to sandy or sandy-skeletal material is 23 to 38 inches.

The A horizon has hue of 2.5YR to 7.5YR. The Bt horizon has hue of 10R to 5YR. The content of rock fragments in the 2C horizon is 25 to 60 percent.

Azeltine Series

The Azeltine series consists of deep, well drained soils on terraces and fans. These soils formed in alluvium. Slope is 3 to 6 percent. The average annual precipitation is 15 to 18 inches, and the average annual air temperature is 44 to 46 degrees F.

These soils are fine-loamy over sandy or sandy-skeletal, mixed, mesic Torriorthentic Haplustolls.

Typical pedon of Azeltine gravelly sandy loam, in an area of Atencio-Azeltine complex, 3 to 6 percent slopes; 2,800 feet north of the southwest corner of sec. 34, T. 7 S., R. 88 W.

A—0 to 9 inches; reddish gray (5YR 5/2) gravelly sandy loam, dark reddish brown (5YR 3/2) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic; about 20 percent gravel; calcareous; moderately alkaline; clear wavy boundary.

C1—9 to 16 inches; reddish brown (5YR 5/3) gravelly loam, reddish brown (5YR 4/3) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, very friable, slightly sticky and slightly plastic; about 25 percent gravel and 5 percent cobbles; calcareous; moderately alkaline; clear wavy boundary.

2C2—16 to 60 inches; extremely gravelly sand; about 45 percent gravel and 20 percent cobbles; calcareous; moderately alkaline.

The mollic epipedon is 6 to 14 inches thick. Lime is at a depth of 0 to 14 inches. Depth to the 2C horizon is 16 to 34 inches.

Brownsto Series

The Brownsto series consists of deep, well drained soils on fans and terraces. These soils formed in coarse textured, calcareous alluvium. Slope is 6 to 50 percent. The average annual precipitation is 12 to 14 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are loamy-skeletal, mixed Borollic Calciorthids.

Typical pedon of Brownsto gravelly sandy loam, in an area of Forelle-Brownsto complex, 12 to 25 percent slopes; about 200 feet west and 1,700 feet north of the southeast corner of sec. 20, T. 4 S., R. 85 W.

A—0 to 4 inches; light brownish gray (10YR 6/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; about 15 percent

gravel; calcareous; moderately alkaline; clear wavy boundary.

AC—4 to 11 inches; light brownish gray (10YR 6/2) gravelly loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; about 15 percent gravel; calcareous; moderately alkaline; clear wavy boundary.

Ck1—11 to 21 inches; white (10YR 8/2) very gravelly sandy loam, pale brown (10YR 6/3) moist; massive; hard, very friable, nonsticky and nonplastic; about 45 percent gravel; few soft masses of secondary calcium carbonate; calcareous; about 60 percent calcium carbonate equivalent; moderately alkaline; clear wavy boundary.

Ck2—21 to 30 inches; light gray (10YR 7/2) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; about 35 percent gravel; disseminated calcium carbonate; calcareous; moderately alkaline; clear wavy boundary.

Ck3—30 to 42 inches; light gray (10YR 7/2) very gravelly loamy sand, grayish brown (2.5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; about 40 percent gravel; disseminated calcium carbonate; calcareous; moderately alkaline; abrupt irregular boundary.

Ck4—42 to 54 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; about 20 percent gravel; disseminated calcium carbonate; calcareous; moderately alkaline; clear wavy boundary.

C—54 to 60 inches; very pale brown (10YR 7/3) gravelly sandy loam, light brown (7.5YR 6/4) moist; massive; soft, very friable, nonsticky and nonplastic; about 25 percent gravel; calcareous; moderately alkaline.

Secondary lime is at a depth of 4 to 12 inches. The control section is 35 to 60 percent rock fragments. Hue is 2.5Y to 7.5YR. The control section averages 15 to 40 percent calcium carbonate.

Callings Series

The Callings series consists of deep, well drained soils on convex ridgetops and mountainsides. These soils formed in alluvium and colluvium derived dominantly from sandstone. Slope is 12 to 65 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 39 to 41 degrees F.

These soils are clayey-skeletal, montmorillonitic Boralfic Cryoborolls.

Typical pedon of Callings loam, in an area of Yeljack-Callings complex, 12 to 25 percent slopes; about 2,640 feet north of the southeast corner of sec. 14, T. 10 S., R. 85 W.

A1—0 to 6 inches; dark brown (7.5YR 3/2) loam, very dark brown (7.5YR 2/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; mildly alkaline; clear smooth boundary.

A2—6 to 12 inches; dark brown (7.5YR 3/2) gravelly loam, very dark brown (7.5YR 2/2) moist; strong fine granular structure; slightly hard, friable, nonsticky and nonplastic; about 15 percent gravel; mildly alkaline; clear irregular boundary.

E—12 to 23 inches; pinkish gray (7.5YR 6/2) very cobbly clay loam, brown (7.5YR 4/2) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; about 25 percent gravel and 25 percent cobbles; mildly alkaline; clear irregular boundary.

B/E—23 to 34 inches; brown (7.5YR 5/4) very cobbly clay loam, dark brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; about 20 percent gravel, 20 percent cobbles, and 2 percent stones; mildly alkaline; clear irregular boundary.

Bt—34 to 53 inches; brown (7.5YR 5/4) very gravelly clay loam, brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; hard, firm, sticky and slightly plastic; about 25 percent gravel, 10 percent cobbles, and 5 percent stones; mildly alkaline; gradual smooth boundary.

C—53 to 60 inches; brown (7.5YR 5/4) very cobbly sandy clay loam, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; about 15 percent gravel, 20 percent cobbles, and 5 percent stones; mildly alkaline.

The mollic epipedon is 10 to 15 inches thick. The solum is 35 to 60 inches thick. The A1 horizon has hue of 7.5YR or 10YR. The E horizon has hue of 7.5YR or 10YR. The Bt horizon has hue of 5YR or 7.5YR. The C horizon has hue of 5YR or 7.5YR.

Charcol Series

The Charcol series consists of deep, well drained soils on mountain side slopes. These soils formed in residuum and colluvium. Slope is 12 to 50 percent. The average annual precipitation is 18 to 22 inches, and the average annual air temperature is 39 to 41 degrees F.

These soils are loamy-skeletal, mixed Cryic Pachic Paleborolls.

Typical pedon of Charcol very stony fine sandy loam, in an area of Charcol-Mord complex, 25 to 50 percent slopes; in the NE¼NW¼ of sec. 35, T. 4 S., R. 83 W.

O—1 inch to 0; undecomposed needles.

A—0 to 20 inches; brown (7.5YR 5/2) very stony fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable, slightly sticky and nonplastic; about 25 percent cobbles and 5 percent stones; medium acid; abrupt smooth boundary.

E—20 to 46 inches; pink (7.5YR 7/4) very cobbly loam, brown (7.5YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; about 40 percent cobbles and 15 percent stones; medium acid; gradual wavy boundary.

Bt—46 to 60 inches; light reddish brown (2.5YR 6/4) very cobbly sandy clay loam, reddish brown (2.5YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; thin continuous clay films on peds; about 50 percent cobbles and 10 percent stones; medium acid; clear smooth boundary.

The mollic epipedon is 20 to 34 inches thick. Depth to the Bt horizon is 40 to more than 60 inches. The control section is 35 to 60 percent rock fragments.

The content of rock fragments in the A horizon is 20 to 50 percent. Hue is 10YR to 5YR. The E horizon has hue of 7.5YR or 5YR. It is 10 to 35 inches thick. The content of rock fragments in the Bt horizon is 35 to 70 percent. Hue is 2.5YR.

Cochetopa Series

The Cochetopa series consists of deep, well drained soils on alluvial fans and valley side slopes. These soils formed in alluvium derived dominantly from basalt. Slope is 6 to 40 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 36 to 38 degrees F.

These soils are fine, montmorillonitic Argic Pachic Cryoborolls.

Typical pedon of Cochetopa loam, in an area of Cochetopa-Antrobus association, 12 to 25 percent slopes; about 1,500 feet north and 300 feet west of the southeast corner of sec. 31, T. 2 S., R. 83 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, friable, nonsticky and nonplastic; neutral; clear smooth boundary.

BA—3 to 14 inches; very dark grayish brown (10YR 3/2) clay loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

Bt1—14 to 19 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; about 5 percent gravel; thin continuous clay films on peds; neutral; clear smooth boundary.

Bt2—19 to 38 inches; brown (7.5YR 5/4) clay loam, brown (7.5YR 4/4) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; about 5 percent gravel; continuous clay films on peds; neutral; clear smooth boundary.

C—38 to 60 inches; brown (7.5YR 5/4) gravelly clay loam, brown (7.5YR 4/4) moist; massive; hard, firm, sticky and plastic; about 20 percent gravel and 5 percent cobbles; neutral.

Lime is at a depth of 40 to 60 inches. The content of rock fragments is 5 to 35 percent. Hue is 2.5Y to 7.5YR. The Bt horizon is clay loam or clay.

Coulterg Series

The Coulterg series consists of deep, well drained soils on mountainsides and colluvial and alluvial fans. These soils formed in siltstone, soft shale, and limestone. Slope is 12 to 50 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 39 to 43 degrees F.

These soils are fine-loamy, mixed Typic Haploborolls.

Typical pedon of Coulterg loam, 12 to 50 percent slopes, about 2,500 feet north and 2,000 feet east of the southwest corner of sec. 34, T. 5 S., R. 86 W.

A1—0 to 14 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; about 5 percent channers; calcareous; moderately alkaline; clear smooth boundary.

A2—14 to 19 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; about 5 percent channers; calcareous; moderately alkaline; about 7 percent calcium carbonate equivalent; clear smooth boundary.

Cky1—19 to 30 inches; grayish brown (10YR 5/2) loam, brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and slightly plastic; about 5 percent

channers; calcareous; moderately alkaline; about 10 percent calcium carbonate equivalent; common fine gypsum crystals; clear wavy boundary.

Cky2—30 to 60 inches; grayish brown (10YR 5/2) loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; about 3 percent cobbles and 3 percent flagstones; calcareous; moderately alkaline; about 14 percent calcium carbonate equivalent; common fine gypsum crystals.

The mollic epipedon is 10 to 15 inches thick. The soils are generally calcareous but may be noncalcareous in the upper few inches in some pedons. The particle-size control section is 18 to 30 percent clay. Hue is 10YR to 5Y. The content of rock fragments is 0 to 20 percent.

Curecanti Series

The Curecanti series consists of deep, well drained soils on mountain slopes. These soils formed in colluvium and alluvium derived from sandstone. Slope is 6 to 25 percent. The average annual precipitation is 14 to 17 inches, and the average annual air temperature is 42 to 44 degrees F.

These soils are loamy-skeletal, mixed Typic Argiborolls.

Typical pedon of Curecanti extremely stony loam, in an area of Curecanti-Fughes complex, 12 to 25 percent slopes; about 2,100 feet south and 900 feet east of the northwest corner of sec. 22, T. 4 S., R. 83 W.

A1—0 to 7 inches; brown (7.5YR 4/2) extremely stony loam, dark reddish brown (5YR 2/2) moist; weak fine subangular blocky structure parting to moderate fine crumb; soft, friable, slightly sticky and slightly plastic; about 35 percent gravel, 20 percent cobbles, and 20 percent stones; neutral; clear smooth boundary.

A2—7 to 10 inches; reddish brown (5YR 4/3) extremely stony loam, dark reddish brown (5YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; about 20 percent gravel, 30 percent cobbles, and 20 percent stones; neutral; clear smooth boundary.

Bt1—10 to 28 inches; reddish brown (5YR 4/4) extremely stony sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; about 30 percent gravel, 10 percent cobbles, and 30 percent stones; neutral; clear smooth boundary.

Bt2—28 to 47 inches; reddish brown (5YR 5/4) extremely stony clay loam, reddish brown (5YR 4/4) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; thin continuous clay films on peds; about 30 percent gravel, 10 percent cobbles, and 30 percent stones; neutral; clear smooth boundary.

Bt3—47 to 60 inches; reddish brown (5YR 5/4) extremely cobbly clay loam, reddish brown (5YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; about 30 percent gravel, 20 percent cobbles, and 15 percent stones; neutral.

The solum is 54 to 60 inches thick. The upper 20 inches of the Bt horizon is 28 to 35 percent clay. The content of rock fragments is 35 to 70 percent.

Cushool Series

The Cushool series consists of moderately deep, well drained soils on upland hills, ridges, and side slopes. These soils formed in residuum and alluvium derived from calcareous shale and sandstone. Slope is 12 to 50 percent. The average annual precipitation is 12 to 15 inches, and the average annual air temperature is 42 to 45 degrees F.

These soils are fine-loamy, mixed Borollic Haplargids.

Typical pedon of Cushool loam, in an area of Cushool-Rentsac complex, 15 to 65 percent slopes; about 900 feet south and 800 feet west of the northeast corner of sec. 36, T. 4 S., R. 87 W.

A1—0 to 3 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure parting to weak fine granular; soft, very friable, slightly sticky and nonplastic; about 10 percent channery fragments; moderately alkaline; clear wavy boundary.

A2—3 to 7 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; about 10 percent channery fragments; moderately alkaline; clear wavy boundary.

Bt1—7 to 11 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; thin patchy clay films on peds; about 12 percent channery fragments; calcareous; moderately alkaline; clear wavy boundary.

Bt2—11 to 13 inches; light yellowish brown (10YR 6/4) channery loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard,

friable, slightly sticky and slightly plastic; moderate patchy clay films on peds; about 15 percent channery fragments; calcareous; moderately alkaline; clear wavy boundary.

Bk1—13 to 26 inches; light gray (2.5Y 7/2) channery loam, olive (5Y 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few thin discontinuous clay films on peds; about 20 percent channery fragments; secondary calcium carbonate occurring as soft masses and seams; calcareous; moderately alkaline; clear wavy boundary.

Bk2—26 to 35 inches; light brownish gray (2.5Y 6/2) extremely channery sandy loam, olive gray (5Y 5/2) moist; massive; loose, slightly sticky and slightly plastic; about 70 percent channers; secondary calcium carbonate occurring as soft nodules and seams; calcareous; moderately alkaline; clear wavy boundary.

Cr—35 inches; calcareous, soft sandstone.

Paralithic contact is at a depth of 20 to 40 inches. The content of coarse fragments ranges from 0 to 30 percent in a major part of the solum, including the Bk horizon. Lime is at a depth of 6 to 36 inches. Hue is 5Y to 7.5YR. The content of clay in the Bt horizon is 18 to 25 percent. The content of silt is 5 to 30 percent, and that of sand is 40 to 75 percent. More than 40 percent of the sand is fine sand or coarser sand.

Dahlquist Series

The Dahlquist series consists of deep, well drained soils on fans, terraces, and terrace side slopes. These soils formed in alluvium. Slope is 6 to 50 percent. The average annual precipitation is 12 to 14 inches, and the average annual air temperature is 42 to 46 degrees F.

These soils are loamy-skeletal, mixed Borollic Haplargids.

Typical pedon of Dahlquist cobbly sandy loam, in an area of Dahlquist-Southace complex, 6 to 12 percent slopes; about 3,000 feet south and 300 feet east of the northwest corner of sec. 26, T. 4 S., R. 84 W.

A—0 to 6 inches; brown (7.5YR 5/2) cobbly sandy loam, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; about 10 percent cobbles and 10 percent gravel; mildly alkaline; clear smooth boundary.

Bt—6 to 13 inches; light brown (7.5YR 6/4) very cobbly sandy clay loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocky; hard, friable, slightly sticky and slightly plastic; about 20 percent cobbles and 25 percent gravel; mildly alkaline; clear smooth boundary.

Bk1—13 to 23 inches; pink (7.5YR 7/4) very cobbly sandy loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable, slightly sticky and nonplastic; about 30 percent gravel, 20 percent cobbles, and 10 percent stones; secondary calcium carbonate disseminated and occurring as coatings on the underside of rock fragments; calcareous; moderately alkaline; clear smooth boundary.

Bk2—23 to 60 inches; pink (7.5YR 7/4) extremely cobbly sandy loam, brown (7.5YR 5/4) moist; single grain; loose, nonsticky and nonplastic; about 30 percent gravel, 30 percent cobbles, and 10 percent stones; secondary calcium carbonate disseminated and occurring as coatings on the underside of rock fragments; calcareous; moderately alkaline.

Depth to the base of the argillic horizon is 10 to 15 inches. Secondary lime is at a depth of 10 to 15 inches. The content of rock fragments in the A horizon is 5 to 20 percent. Hue is 10YR or 7.5YR. The content of rock fragments in the Bt horizon is 35 to 60 percent. Hue is 10YR to 5YR. The content of rock fragments in the C horizon is 40 to 70 percent. Hue is 10YR or 7.5YR.

Dollard Series

The Dollard series consists of moderately deep, well drained soils on mountainsides and ridges. These soils formed in residuum and colluvium derived dominantly from shale. Slope is 12 to 65 percent. The average annual precipitation is 15 to 18 inches, and the average annual air temperature is 42 to 44 degrees F.

These soils are fine, montmorillonitic (calcareous), frigid Ustic Torriorthents.

Typical pedon of Dollard clay loam, in an area of Dollard-Rock outcrop, shale complex, 25 to 65 percent slopes; about 1,100 feet north and 2,000 feet east of the southwest corner of sec. 34, T. 8 S., R. 86 W.

A—0 to 4 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse granular structure parting to moderate thin platy; hard, friable, slightly sticky and plastic; calcareous; moderately alkaline; gradual smooth boundary.

AC—4 to 11 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocky; very hard, friable,

sticky and plastic; calcareous; moderately alkaline; gradual smooth boundary.

Ck—11 to 33 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; few soft masses of calcium carbonate; calcareous; moderately alkaline; clear smooth boundary.

Cr—33 inches; soft, calcareous shale.

Paralithic contact is at a depth of 20 to 40 inches. Secondary lime is at a depth of 10 to 36 inches. The control section is 35 to 50 percent clay. The content of soft shale fragments, consisting dominantly of small chips, ranges from 0 to 15 percent, by volume, in the A horizon and is as much as 35 percent in the C horizon.

Dotsero Series

The Dotsero series consists of deep, well drained soils on mountain and terrace side slopes and on benches. These soils formed in residuum and colluvium derived from pumice, tuff, and basalt. Slope is 1 to 25 percent. The average annual precipitation is 11 to 16 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are coarse-loamy, mixed Pachic Haploborolls.

Typical pedon of Dotsero gravelly sandy loam, 5 to 25 percent slopes, about 1,600 feet east and 975 feet north of the southwest corner of sec. 26, T. 4 S., R. 86 W.

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; about 20 percent gravel; neutral; clear smooth boundary.

A2—7 to 21 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; about 20 percent gravel; neutral; clear smooth boundary.

A3—21 to 31 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; about 20 percent gravel; calcareous; moderately alkaline; clear smooth boundary.

Bk1—31 to 41 inches; dark grayish brown (2.5Y 4/2) gravelly sandy loam, very dark grayish brown (2.5Y 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; about 20 percent gravel; lime in thin seams; calcareous; moderately alkaline; clear smooth boundary.

2Bk2—41 to 60 inches; light brown (7.5YR 6/4) fine sandy loam, brown (7.5YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; about 10 percent gravel; lime in thin seams; calcareous; moderately alkaline.

Lime is at a depth of 20 to 40 inches. The control section is 15 to 30 percent rock fragments. In some pedons alluvial material is below a depth of 40 inches.

Earsman Series

The Earsman series consists of shallow, somewhat excessively drained soils on mountainsides and ridges. These soils formed in residuum and colluvium derived dominantly from redbed calcareous sandstone. Slope is 12 to 65 percent. The average annual precipitation is 14 to 16 inches, and the average annual air temperature is 42 to 44 degrees F.

These soils are loamy-skeletal, mixed (calcareous), frigid Lithic Ustic Torriorthents.

Typical pedon of Earsman very stony sandy loam, in an area of Earsman-Rock outcrop complex, 12 to 65 percent slopes; about 500 feet south and 400 feet east of the northwest corner of sec. 10, T. 7 S., R. 88 W.

A—0 to 5 inches; reddish brown (2.5YR 4/4) very stony sandy loam, dark reddish brown (2.5YR 3/4) moist; weak very fine granular structure; loose, very friable, nonsticky and nonplastic; about 25 percent gravel, 4 percent cobbles, and 17 percent stones; calcareous; moderately alkaline; gradual wavy boundary.

AC—5 to 14 inches; red (10R 5/6) very channery sandy loam, red (10YR 4/6) moist; single grain; loose, very friable, nonsticky and nonplastic; about 35 percent channers, 10 percent cobbles, and 10 percent stones; secondary calcium carbonate coatings on rock fragments; calcareous; gradual broken boundary.

C—14 to 19 inches; red (2.5YR 5/6) very channery sandy loam, red (2.5YR 4/6) moist; single grain; loose, very friable, nonsticky and nonplastic; about 30 percent channers, 15 percent cobbles, and 15 percent stones; secondary calcium carbonate coatings on rock fragments; calcareous; abrupt wavy boundary.

R—19 inches; hard, calcareous sandstone.

Bedrock is at a depth of 10 to 20 inches. The control section is 35 to 60 percent rock fragments. Lime is at a depth of 0 to 5 inches. Hue is 10R to 5YR.

Empedrado Series

The Empedrado series consists of deep, well drained soils on upland hills and fans. These soils formed in alluvium and eolian material. Slope is 2 to 25 percent. The average annual precipitation is 15 to 18 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are fine-loamy, mixed Typic Argiborolls.

Typical pedon of Empedrado loam, 2 to 6 percent slopes, about 1,300 feet north and 1,600 feet east of the southwest corner of sec. 8, T. 7 S., R. 88 W.

A—0 to 5 inches; brown (7.5YR 4/2) loam, dark brown (10YR 3/2) moist; weak thick platy structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.

BA—5 to 14 inches; brown (7.5YR 4/2) clay loam, dark brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; mildly alkaline; clear smooth boundary.

Bt1—14 to 27 inches; brown (7.5YR 5/2) clay loam, brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, very firm, sticky and plastic; mildly alkaline; gradual smooth boundary.

Bt2—27 to 40 inches; brown (7.5YR 5/4) clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, very firm, very sticky and plastic; mildly alkaline; gradual wavy boundary.

Bk—40 to 60 inches; brown (7.5YR 5/4) clay loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; hard, firm, very sticky and plastic; secondary calcium carbonate in fine seams; calcareous; moderately alkaline.

The solum is 20 to more than 50 inches thick. Secondary lime is at a depth of 20 to 40 inches. The control section is 0 to 15 percent rock fragments. Hue generally is 10YR or 7.5YR, but some pedons have subhorizons with hue of 5YR.

Etoe Series

The Etoe series consists of deep, well drained soils on mountainsides. These soils formed in material derived from sandstone and shale. Slope is 15 to 50 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are loamy-skeletal, mixed Typic Paleboralfs.

Typical pedon of Etoe loam, 15 to 50 percent slopes, about 2,200 feet south and 1,400 feet west of the northeast corner of sec. 6, T. 7 S., R. 89 W.

O—1 inch to 0; grasses, leaves, and twigs in various stages of decomposition.

E1—0 to 8 inches; pinkish gray (7.5YR 6/2) loam, brown (7.5YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; about 10 percent gravel; slightly acid; clear wavy boundary.

E2—8 to 24 inches; light brownish gray (10YR 6/2) extremely cobbly sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; about 65 percent cobbles; slightly acid; clear wavy boundary.

B/E—24 to 35 inches; brown (10YR 5/3) extremely cobbly sandy clay loam, dark brown (10YR 4/3) moist (B); light brownish gray (10YR 6/2) extremely cobbly sandy loam, brown (10YR 5/3) moist (E); weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; about 65 percent cobbles; slightly acid; clear wavy boundary.

Bt—35 to 60 inches; brown (7.5YR 5/4) extremely stony sandy clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; about 70 percent stones; thin nearly continuous clay films on sides of coarse fragments; slightly acid.

Some pedons have a thin A horizon. Depth to the argillic horizon ranges from 30 to 40 inches. The E and B/E horizons have hue of 10YR or 7.5YR.

Evanston Series

The Evanston series consists of deep, well drained soils on alluvial fans, terraces, and valley sides. These soils formed in mixed alluvium. Slope is 1 to 65 percent. The average annual precipitation is 13 to 15 inches, and the average annual air temperature is 42 to 46 degrees F.

These soils are fine-loamy, mixed Aridic Argiborolls.

Typical pedon of Evanston loam, 6 to 25 percent slopes, about 1,200 feet south and 500 feet east of the northwest corner of sec. 26, T. 4 S., R. 86 W.

A1—0 to 4 inches; brown (7.5YR 5/2) loam, dark brown (7.5YR 3/2) moist; weak medium granular structure; slightly hard, very friable, nonsticky and nonplastic; mildly alkaline; clear smooth boundary.

A2—4 to 14 inches; brown (7.5YR 5/2) loam, dark

brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; mildly alkaline; clear smooth boundary.

Bt—14 to 20 inches; brown (7.5YR 5/4) clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; thin nearly continuous clay films on peds; mildly alkaline; clear smooth boundary.

Bk1—20 to 31 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; weak coarse subangular blocky structure; hard, friable, sticky and plastic; few thin clay films on peds; calcium carbonate occurring as thin seams; calcareous; moderately alkaline; clear smooth boundary.

Bk2—31 to 37 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; weak coarse subangular blocky structure; hard, friable, sticky and slightly plastic; secondary calcium carbonate occurring as thin seams; calcareous; moderately alkaline; clear smooth boundary.

Bk3—37 to 60 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, sticky and slightly plastic; secondary calcium carbonate occurring as soft masses and thin seams; calcareous; moderately alkaline.

Lime is at a depth of 8 to 20 inches. The solum is 15 to 50 inches thick. The content of gravel is 0 to 5 percent throughout the profile. Hue is 2.5Y to 7.5YR. The content of clay in the Bt horizon is 25 to 35 percent. The content of fine sand or coarser sand ranges from 15 to 35 percent.

Forelle Series

The Forelle series consists of deep, well drained soils on mountains and benches. These soils formed in alluvium derived dominantly from sedimentary rock. Slope is 6 to 25 percent. The average annual precipitation is 12 to 14 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are fine-loamy, mixed Borollic Haplargids.

Typical pedon of Forelle loam, in an area of Forelle-Brownsto complex, 6 to 12 percent slopes; about 200 feet north and 1,900 feet west of the southeast corner of sec. 20, T. 4 S., R. 85 W.

A1—0 to 2 inches; brown (10YR 5/3) loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; neutral; abrupt smooth boundary.

A2—2 to 6 inches; brown (7.5YR 5/2) loam, brown (7.5YR 4/2) moist; weak medium subangular blocky structure parting to weak medium granular; soft, very friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

Bt—6 to 12 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; weak to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.

Bk1—12 to 30 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; secondary calcium carbonate in thin seams; calcareous; moderately alkaline; gradual smooth boundary.

Bk2—30 to 40 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; secondary calcium carbonate in thin seams and occurring as soft masses; calcareous; moderately alkaline; gradual smooth boundary.

Bk3—40 to 53 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; secondary calcium carbonate in soft masses; calcareous; moderately alkaline; gradual smooth boundary.

Bk4—53 to 60 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; calcium carbonate in soft masses; calcareous; moderately alkaline.

Hue is 5Y to 7.5YR throughout the profile. The content of clay in the Bt horizon is 18 to 35 percent.

Forsey Series

The Forsey series consists of deep, well drained soils on fans, mountain side slopes, and ridges. These soils formed in colluvium, alluvium, and residuum. Slope is 3 to 65 percent. The average annual precipitation is 17 to 19 inches, and the average annual air temperature is 38 to 42 degrees F.

These soils are loamy-skeletal, mixed Argic Cryoborolls.

Typical pedon of Forsey cobbly loam, 25 to 65 percent slopes, about 1,300 feet north and 1,000 feet west of the southeast corner of sec. 28, T. 3 S., R. 85 W.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; about 20 percent

cobbles and 5 percent stones; mildly alkaline; clear smooth boundary.

A2—3 to 10 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark brown (10YR 2/2) moist; weak moderate subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; about 15 percent cobbles and 5 percent stones; mildly alkaline; clear wavy boundary.

Bt1—10 to 14 inches; brown (7.5YR 5/4) very cobbly clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; about 40 percent cobbles and 10 percent stones; mildly alkaline; clear wavy boundary.

Bt2—14 to 22 inches; light brown (7.5YR 6/4) very cobbly clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; about 40 percent cobbles and 10 percent stones; mildly alkaline; clear wavy boundary.

Bk1—22 to 37 inches; light brown (7.5YR 6/4) very cobbly sandy clay loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; about 40 percent cobbles and 15 percent stones; secondary calcium carbonate in seams and occurring as coatings on rock fragments; calcareous; moderately alkaline; clear wavy boundary.

Bk2—37 to 60 inches; light brown (7.5YR 6/4) very cobbly sandy clay loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, sticky and plastic; about 45 percent cobbles and 15 percent stones; lime in fine seams and occurring as coatings on rock fragments; calcareous; moderately alkaline.

The mollic epipedon is 7 to 15 inches thick. The solum is 16 to 28 inches thick. The control section is 35 to 50 percent rock fragments.

Fughes Series

The Fughes series consists of deep, well drained soils on foot slopes and mountainsides. These soils formed in alluvium and colluvium. Slope is 3 to 25 percent. The average annual precipitation is 14 to 17 inches, and the average annual air temperature is 42 to 44 degrees F.

These soils are fine, montmorillonitic Pachic Argiborolls.

Typical pedon of Fughes stony loam, in an area of Curecanti-Fughes complex, 6 to 12 percent slopes; about 2,300 feet south and 1,600 feet east of the northwest corner of sec. 22, T. 4 S., R. 83 W.

A—0 to 10 inches; very dark grayish brown (10YR 3/2) stony loam, very dark brown (10YR 2/2) moist; weak medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; 0.1 percent stones, 3 percent cobbles, and 5 percent gravel; neutral; clear smooth boundary.

BA—10 to 16 inches; very dark grayish brown (10YR 3/2) clay loam, very dark brown (10YR 2/2) moist; strong medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few stones and cobbles and 5 percent gravel; neutral; clear smooth boundary.

Bt1—16 to 36 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; strong medium prismatic structure parting to strong medium angular blocky; very hard, firm, very sticky and very plastic; few fine faint light reddish brown mottles; few stones and cobbles and 5 percent gravel; neutral; clear smooth boundary.

Bt2—36 to 46 inches; reddish brown (5YR 5/3) clay, reddish brown (5YR 4/4) moist; moderate medium angular blocky structure; very hard, firm, very sticky and plastic; few fine faint light reddish brown mottles; few stones and cobbles; neutral; clear smooth boundary.

BC—46 to 60 inches; reddish brown (5YR 5/3) clay loam, reddish brown (5YR 4/3) moist; strong medium subangular blocky structure; very hard, firm, sticky and plastic; few fine faint light reddish brown mottles; neutral.

The mollic epipedon is 16 to 40 inches thick. The control section is 5 to 15 percent rock fragments. Hue is 5YR to 7.5YR. Reaction is neutral or mildly alkaline.

Goslin Series

The Goslin series consists of deep, well drained soils on fan toe slopes, fans, and terraces. These soils formed in reddish, sandy alluvium. Slope is 3 to 25 percent. The average annual precipitation is 12 to 14 inches, and the average annual air temperature is 42 to 46 degrees F.

These soils are coarse-loamy, mixed (calcareous), frigid Ustic Torriorthents.

Typical pedon of Goslin fine sandy loam, 3 to 6 percent slopes, about 2,000 feet north and 1,200 feet east of the southwest corner of sec. 27, T. 4 S., R. 86 W.

A1—0 to 1 inch; reddish brown (5YR 4/4) fine sandy loam, reddish brown (2.5YR 4/4) moist; weak thick platy structure; slightly hard, very friable, nonsticky

and nonplastic; calcareous; moderately alkaline; clear wavy boundary.

A2—1 to 5 inches; reddish brown (5YR 4/4) fine sandy loam, reddish brown (2.5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; calcareous; moderately alkaline; gradual wavy boundary.

C1—5 to 24 inches; reddish brown (2.5YR 4/4) fine sandy loam, reddish brown (2.5YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; calcareous; moderately alkaline; gradual wavy boundary.

C2—24 to 60 inches; reddish brown (2.5YR 4/4) fine sandy loam, reddish brown (2.5YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; calcareous; moderately alkaline.

The soils are commonly calcareous throughout, but some pedons are leached of calcium carbonate in the upper few inches. The content of rock fragments is 0 to 35 percent. The control section is 8 to 18 percent clay. The A and C horizons have hue of 7.5YR to 2.5YR.

Gothic Series

The Gothic series consists of deep, well drained soils on side slopes of valley fill and on alluvial fans. These soils formed in moderately fine textured alluvium and glacial till. Slope is 1 to 65 percent. The average annual precipitation is 18 to 22 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are fine, montmorillonitic Argic Cryoborolls.

Typical pedon of Gothic loam, 25 to 65 percent slopes, about 1,500 feet north and 1,700 feet east of the southwest corner of sec. 29, T. 8 S., R. 87 W.

Oi—2 inches to 0; grasses, leaves, and twigs in various stages of decomposition.

A—0 to 12 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate coarse granular structure; slightly hard, friable, slightly sticky and slightly plastic; about 5 percent gravel; neutral; clear smooth boundary.

Bt1—12 to 25 inches; yellowish brown (10YR 5/4) clay, dark grayish brown (10YR 4/2) moist; strong coarse prismatic structure parting to strong medium angular blocky; hard, very firm, sticky and very plastic; about 5 percent gravel; neutral; clear smooth boundary.

Bt2—25 to 34 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; strong medium and fine angular blocky structure; hard, very firm, very sticky and very plastic; about 5 percent gravel; neutral; clear smooth boundary.

BC—34 to 48 inches; brown (7.5YR 5/4) gravelly clay loam, brown (7.5YR 5/4) moist; moderate coarse subangular blocky structure parting to strong fine angular blocky; slightly hard, firm, sticky and plastic; about 30 percent gravel; neutral; clear smooth boundary.

C—48 to 60 inches; light brown (7.5YR 6/4) gravelly clay loam, brown (7.5YR 5/2) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and plastic; noncalcareous; about 30 percent gravel; neutral.

The mollic epipedon is 8 to 15 inches thick. The A horizon is slightly acid to mildly alkaline. The B horizon is clay loam or clay. It is neutral or mildly alkaline. The C horizon is neutral to moderately alkaline. The soils are calcareous below a depth of 40 inches in some pedons.

Grotte Series

The Grotte series consists of deep, well drained soils on mountainsides. These soils formed in gravelly alluvium and colluvium derived from shale and sandstone. Slope is 25 to 65 percent. The average annual precipitation is 15 to 17 inches, and the average annual temperature is 35 to 38 degrees F.

These soils are loamy-skeletal, mixed (calcareous), frigid Ustic Torriorthents.

Typical pedon of Grotte gravelly loam, 25 to 65 percent slopes, about 500 feet north and 1,500 feet east of the southwest corner of sec. 12, T. 5 S., R. 87 W.

A1—0 to 4 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure parting to weak fine granular; slightly hard, friable, nonsticky and slightly plastic; about 30 percent gravel-sized sandstone fragments; mildly alkaline; clear smooth boundary.

A2—4 to 7 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; weak medium platy structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; about 30 percent gravel-sized sandstone fragments; calcareous; moderately alkaline; gradual wavy boundary.

C1—7 to 24 inches; pale brown (10YR 6/3) very channery clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky

structure; hard, firm, slightly sticky and slightly plastic; about 45 percent channers; calcareous; moderately alkaline; clear irregular boundary.

C2—24 to 60 inches; light brownish gray (10YR 6/2) very channery clay loam, grayish brown (2.5Y 5/2) moist; massive; hard, firm, sticky and plastic; about 45 percent channers; calcareous; moderately alkaline.

The soils generally are calcareous throughout but may be noncalcareous in part of the profile. The content of coarse fragments ranges from 35 to 75 percent.

The solum is 2 to 7 inches thick. The A1 and A2 horizons have hue of 2.5Y or 10YR. The C horizon has hue of 2.5Y or 10YR.

Ipson Series

The Ipson series consists of deep, well drained soils on terraces and fans. These soils formed in alluvium and outwash derived dominantly from sandstone and basalt. Slope is 3 to 50 percent. The average annual precipitation is 13 to 15 inches, and the average annual air temperature is 42 to 46 degrees F.

These soils are loamy-skeletal, mixed Aridic Agriborolls.

Typical pedon of Ipson cobbly loam, 3 to 25 percent slopes, about 100 feet north and 850 feet east of the southwest corner of sec. 13, T. 8 S., R. 87 W.

A1—0 to 2 inches; brown (7.5YR 5/2) cobbly loam, dark brown (7.5YR 3/2) moist; moderate very fine granular structure; soft, friable, nonsticky and nonplastic; about 15 percent cobbles; neutral; clear smooth boundary.

A2—2 to 14 inches; brown (7.5YR 4/2) cobbly loam, dark brown (7.5YR 3/2) moist; moderate coarse granular structure; slightly hard, friable, slightly sticky and plastic; about 10 percent gravel and 15 percent cobbles; mildly alkaline; clear smooth boundary.

Bt—14 to 26 inches; brown (7.5YR 5/2) very gravelly sandy clay loam, brown (7.5YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few thin clay films on peds; about 20 percent gravel, 10 percent cobbles, and 5 percent stones; mildly alkaline; clear irregular boundary.

Bk1—26 to 35 inches; brown (7.5YR 5/4) very gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; moderate coarse subangular blocky structure; hard, firm, sticky and plastic; few inconsistent clay films on peds; about 30 percent gravel, 5 percent cobbles, and 5 percent stones; very few small nodules of secondary calcium carbonate; calcareous; moderately alkaline; gradual smooth boundary.

2Bk2—35 to 42 inches; light brown (7.5YR 6/4) gravelly sandy clay loam, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and plastic; few discontinuous clay films on peds; about 10 percent gravel and 5 percent cobbles; thin seams of secondary calcium carbonate, 15 percent calcium carbonate equivalent; calcareous; moderately alkaline; clear smooth boundary.

3Bk3—42 to 54 inches; light brown (7.5YR 6/4) very gravelly sandy clay loam, pinkish gray (7.5YR 6/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; about 50 percent gravel and 5 percent cobbles; secondary calcium carbonate as seams and concretions on pebbles; calcareous; moderately alkaline; clear smooth boundary.

4Bk4—54 to 60 inches; light brown (7.5YR 6/4) gravelly sandy clay loam, pinkish gray (7.5YR 6/2) moist; weak coarse subangular blocky structure; slightly hard, friable, sticky and slightly plastic; about 20 percent gravel and 5 percent cobbles; few nodules and soft masses of secondary calcium carbonate on pebbles; calcareous; moderately alkaline.

The mollic epipedon is 7 to 14 inches thick. The control section is 35 to 50 percent rock fragments. The Bt horizon is very gravelly or very cobbly sandy clay loam or clay loam. The content of rock fragments in the Bk horizon is 35 to 80 percent.

Irrawaddy Series

The Irrawaddy series consists of moderately deep, well drained soils on mountainsides. These soils formed in residuum and colluvium derived from limestone. Slope is 25 to 65 percent. The average annual precipitation is 16 to 20 inches, and the average annual air temperature is 36 to 42 degrees F.

These soils are loamy-skeletal, carbonatic Typic Cryoborolls.

Typical pedon of Irrawaddy very stony loam, 25 to 65 percent slopes, about 750 feet east and 200 feet north of the southwest corner of sec. 34, T. 4 S., R. 87 W.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) very stony loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; about 15 percent

calcium carbonate equivalent; about 40 percent dolomitic stones; calcareous; moderately alkaline; clear smooth boundary.

A2—5 to 14 inches; dark grayish brown (10YR 4/2) very channery loam, dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; about 13 percent calcium carbonate equivalent; about 35 percent dolomitic channery fragments; calcareous; moderately alkaline; clear smooth boundary.

Ck1—14 to 26 inches; pale brown (10YR 6/3) very channery loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; about 45 percent channery fragments; calcium carbonate in seams and streaks; about 51 percent calcium carbonate equivalent; about 45 percent dolomitic channery fragments; calcareous; moderately alkaline; clear smooth boundary.

Ck2—26 to 34 inches; very pale brown (10YR 7/3) very channery loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and slightly plastic; calcium carbonate in seams and streaks; about 42 percent calcium carbonate equivalent; about 40 percent dolomitic channery fragments and 10 percent dolomitic stones; calcium carbonate in seams and streaks; calcareous; moderately alkaline; clear smooth boundary.

R—34 inches; hard, dolomitic limestone.

The mollic epipedon is 10 to 15 inches thick. The control section is 35 to 60 percent rock fragments. Lithic contact is at a depth of 20 to 40 inches. Hue is 2.5Y to 7.5YR.

Iyers Series

The Iyers series consists of moderately deep, well drained soils on hills, ridges, and mountainsides. These soils formed in weathered shale. Slope is 6 to 65 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 37 to 39 degrees F.

These soils are fine, montmorillonitic (calcareous) Typic Cryorthents.

Typical pedon of Iyers silty clay loam, 6 to 25 percent slopes, about 1,200 feet north and 900 feet east of the southwest corner of sec. 11, T. 4 S., R. 84 W.

A—0 to 6 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; calcareous; moderately alkaline; clear smooth boundary.

AC—6 to 15 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; hard, firm, very sticky and very plastic; few small shale chips; calcareous; moderately alkaline; gradual smooth boundary.

C—15 to 33 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure; hard, firm, very sticky and very plastic; calcareous; moderately alkaline; abrupt smooth boundary.

Cr—33 inches; weathered, dark, calcareous shale.

The depth to soft bedrock is 20 to 40 inches. The soil is calcareous throughout. The A horizon has hue of 5Y to 7.5YR. The AC and C horizons are clay loam or clay. Hue is dominantly 5Y to 7.5YR, but horizons redder than 7.5YR occur in some pedons.

Jerry Series

The Jerry series consists of deep, well drained soils on alluvial fans and hills. These soils formed in alluvium derived dominantly from shale and sandstone. Slope is 1 to 65 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 37 to 40 degrees F.

These soils are fine, montmorillonitic Argic Cryoborolls.

Typical pedon of Jerry loam, in an area of Jerry-Millerlake loams, 6 to 25 percent slopes; about 200 feet south and 250 feet west of the northeast corner of sec. 35, T. 4 S., R. 87 W.

Oi—2 inches to 0; undecomposed leaves and twigs.

A—0 to 11 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.

Bt1—11 to 24 inches; brown (10YR 5/3) channery clay loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; about 20 percent channery fragments; thin continuous clay films on peds; mildly alkaline; clear smooth boundary.

Bt2—24 to 34 inches; brown (7.5YR 5/4) channery clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; thin continuous clay films on peds; about 15 percent channery fragments; mildly alkaline; clear wavy boundary.

Ck—34 to 60 inches; grayish brown (2.5Y 5/2) very channery clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; about 40 percent channery fragments; secondary calcium carbonate occurring as nodules and seams; calcareous; mildly alkaline.

The solum is 20 to 50 inches thick. Lime is at a depth of 15 to 40 inches. The content of rock fragments ranges from 15 to 35 percent in most of the control section. These fragments are mainly less than 3 inches in diameter. Hue is 2.5Y to 7.5YR.

Jodero Series

The Jodero series consists of deep, well drained soils on alluvial valley floors in valleys and depressions. These soils formed in alluvium. Slope is 1 to 12 percent. The average annual precipitation is 12 to 16 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are fine-loamy, mixed Cumulic Haploborolls.

Typical pedon of Jodero loam, 1 to 12 percent slopes, about 1,500 feet east and 500 feet north of the southwest corner of sec. 10, T. 7 S., R. 87 W.

A1—0 to 15 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and nonplastic; neutral; clear smooth boundary.

A2—15 to 27 inches; very dark grayish brown (10YR 3/2), stratified loam and silt loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; neutral; clear smooth boundary.

Ab1—27 to 32 inches; very dark grayish brown (10YR 3/2), stratified loam and silt loam, very dark grayish brown (10YR 3/2) moist; weak moderate subangular blocky structure; hard, firm, slightly sticky and slightly plastic; neutral; clear smooth boundary.

Ab2—32 to 39 inches; dark brown (10YR 3/3) loam, dark brown (10YR 3/3) moist; weak moderate subangular blocky structure; hard, firm, slightly sticky and slightly plastic; neutral; clear smooth boundary.

C1—39 to 48 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; massive; hard, firm, sticky and slightly plastic; few thin seams of secondary calcium carbonate; calcareous; mildly alkaline.

C2—48 to 60 inches; dark brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; massive; hard, firm, sticky and slightly plastic; few thin seams of secondary calcium carbonate; calcareous; mildly alkaline.

The mollic epipedon is 40 to more than 60 inches thick. Secondary lime is at a depth of 10 to 40 inches. The control section is 0 to 15 percent rock fragments. Hue is 10YR or 7.5YR.

Kilgore Series

The Kilgore series consists of deep, poorly drained soils on alluvial valley floors, flood plains, low terraces, and alluvial fans. These soils formed in alluvium derived from mixed sources. Slope is 1 to 5 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are fine-loamy over sandy or sandy-skeletal, mixed Cumulic Cryaquolls.

Typical pedon of Kilgore silt loam, about 1,500 feet east and 500 feet south of the northwest corner of sec. 8, T. 7 S., R. 87 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2) moist; few fine yellowish brown (10YR 5/6) mottles; moderate fine granular structure; soft, very friable, slightly sticky and plastic; many fine roots and pores; neutral; clear smooth boundary.

A2—4 to 16 inches; dark gray (10YR 4/1) silt loam, very dark grayish brown (10YR 3/2) moist; few fine yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky and plastic; many fine roots and pores; mildly alkaline; clear smooth boundary.

Ag—16 to 25 inches; dark gray (10YR 4/1) silt loam, very dark gray (10YR 3/1) moist; few fine yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; few fine roots; mildly alkaline; clear smooth boundary.

2Cg—25 to 29 inches; dark gray (10YR 4/1) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; common distinct medium yellowish brown (10YR 5/6) mottles; massive; soft, friable, nonsticky and nonplastic; about 25 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2C—29 to 60 inches; very gravelly loamy sand; single grain; loose; 40 percent gravel and 15 percent cobbles; neutral.

The soils are noncalcareous to a depth of more than 40 inches. Thin organic horizons are at the surface in

some pedons. Depth to the sandy-skeletal substratum ranges from 20 to 40 inches. The control section is 0 to 30 percent rock fragments. The upper part of the control section is silt loam, loam, or clay loam and has 18 to 35 percent clay. Reaction is slightly acid to mildly alkaline.

Kobar Series

The Kobar series consists of deep, well drained soils on fans and terraces. These soils formed in alluvium derived dominantly from Mancos shale. Slope is 1 to 25 percent. The average annual precipitation is 10 to 14 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are fine, montmorillonitic Borollic Camborthids.

Typical pedon of Kobar silty clay loam, 1 to 6 percent slopes, about 450 feet south and 2,600 feet west of the northeast corner of sec. 11, T. 9 S., R. 86 W.

A—0 to 3 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; weak coarse granular structure parting to weak very fine subangular blocky; very hard, firm, sticky and plastic; calcareous; moderately alkaline; clear smooth boundary.

Bw—3 to 25 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate coarse prismatic structure parting to moderate fine subangular blocky; very hard, firm, sticky and very plastic; calcareous; mildly alkaline; gradual smooth boundary.

BC—25 to 35 inches; grayish brown (10YR 5/2) silty clay loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; very hard, firm, very sticky and plastic; few seams of calcium carbonate and gypsum; calcareous; moderately alkaline; clear smooth boundary.

Cy—35 to 50 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; very hard, friable, very sticky and plastic; few seams of secondary calcium carbonate; common gypsum crystals; calcareous; moderately alkaline; clear smooth boundary.

C—50 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak moderate subangular blocky structure; very hard, friable, sticky and plastic; calcareous; moderately alkaline.

The solum is 14 to 36 inches thick. The A horizon has hue of 2.5Y or 10YR. The Bw horizon is slightly effervescent or moderately effervescent in the upper part and strongly effervescent in the lower part. The C horizon has hue of 2.5Y or 5Y. Gypsum crystals are few or common in the upper part.

Leavittville Series

The Leavittville series consists of deep, well drained soils on mesas. These soils formed in residuum derived dominantly from limestone and sandstone. Slope is 4 to 25 percent. The average annual precipitation is 17 to 19 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are fine-loamy, mixed Pachic Cryoborolls.

Typical pedon of Leavittville loam, 4 to 25 percent slopes, about 1,200 feet east and 1,200 feet north of the southwest corner of sec. 33, T. 4 S., R. 87 W.

A1—0 to 13 inches; dark grayish brown (10YR 4/2) loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; hard, friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.

A2—13 to 32 inches; dark grayish brown (10YR 4/2) loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; calcareous; moderately alkaline; abrupt wavy boundary.

2Ck—32 to 50 inches; light gray (10YR 7/2) gravelly clay loam, light brownish gray (10YR 6/2) moist; massive; hard, friable, sticky and plastic; about 30 percent angular pebbles; secondary calcium carbonate coatings on rock fragments; calcareous; moderately alkaline; abrupt wavy boundary.

Cr—50 inches; soft limestone.

Bedrock is at a depth of 40 to 60 inches. Secondary lime is at a depth of 24 to 36 inches. The mollic epipedon is 16 to 34 inches thick. The control section is 0 to 15 percent rock fragments. The content of rock fragments in the C horizon is 15 to 35 percent.

Mergel Series

The Mergel series consists of deep, well drained soils on terraces and concave valley side slopes. These soils formed in alluvium and mixed glacial material. Typically, 3 to 30 percent of the surface is covered with boulders, stones, cobbles, and gravel. Slope is 1 to 65 percent. The average annual precipitation is 16 to 19 inches, and the average annual air temperature is 40 to 43 degrees F.

These soils are loamy-skeletal, mixed Torriorthentic Haploborolls.

Typical pedon of Mergel cobbly loam, in an area of

Uracca, moist-Mergel complex, 1 to 6 percent slopes, extremely stony; near the southeast corner of sec. 2, T. 10 S., R. 85 W.

A—0 to 8 inches; grayish brown (10YR 5/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; about 30 percent cobbles and few stones; calcareous; moderately alkaline; gradual wavy boundary.
AC—8 to 20 inches; brown (7.5YR 5/4) very cobbly sandy loam, brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; about 50 percent cobbles and 5 percent stones; lime coatings on the underside of cobbles and stones; calcareous; moderately alkaline; clear wavy boundary.
Ck—20 to 60 inches; brown (7.5YR 5/4) extremely stony sandy loam, brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; about 50 percent cobbles, 25 percent stones, and 5 percent boulders; lime coatings on the underside of rock fragments; calcareous; moderately alkaline.

Secondary lime is at a depth of 0 to 12 inches. The mollic epipedon is 7 to 15 inches thick. The control section is 35 to 80 percent rock fragments. Hue is 2.5Y to 7.5YR.

Millerlake Series

The Millerlake series consists of deep, well drained soils on alluvial fans and valley side slopes. These soils formed in alluvium and outwash derived dominantly from sedimentary bedrock. Slope is 1 to 45 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are fine-loamy, mixed Argic Pachic Cryoborolls.

Typical pedon of Millerlake loam, 15 to 30 percent slopes, about 2,300 feet south and 1,900 feet east of the northwest corner of sec. 3, T. 4 S., R. 85 W.

A1—0 to 3 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.
A2—3 to 9 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.
A3—9 to 19 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; about 10 percent gravel; mildly alkaline; abrupt wavy boundary.
Bt—19 to 30 inches; brown (7.5YR 5/4) clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; thin continuous clay films on peds; mildly alkaline; clear smooth boundary.
Bk1—30 to 44 inches; very pale brown (10YR 7/3) clay loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few soft nodules of secondary calcium carbonate; calcareous; moderately alkaline; clear smooth boundary.
Bk2—44 to 60 inches; very pale brown (10YR 7/3) very cobbly loam, brown (10YR 6/3) moist; massive; about 45 percent lime-coated cobbles; calcareous; moderately alkaline.

Lime is at a depth of 15 to 40 inches. The content of rock fragments is 0 to 35 percent in a major part of the solum. The depth to skeletal material ranges from 44 to more than 60 inches. Hue is 5YR to 7.5YR. The control section has no mottles or a few faint mottles caused by wetness.

Mine Series

The Mine series consists of deep, well drained soils on fans and valley side slopes. These soils formed in moderately coarse textured, noncalcareous alluvium and colluvium derived dominantly from metamorphic rocks. Slope is 12 to 65 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 36 to 40 degrees F.

These soils are coarse-loamy, mixed, nonacid Typic Cryorthents.

Typical pedon of Mine loam, 25 to 65 percent slopes, about 0.1 mile north of Lupine Drive on Mt. Laurel Drive, City of Aspen, in an unsectionalized area that has a projected legal description of sec. 12, T. 10 S., R. 85 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; slightly acid; gradual smooth boundary.
A2—4 to 16 inches; brown (10YR 5/3) gravelly sandy loam, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; about 20 percent gravel, 10 percent cobbles, and 5 percent stones; medium acid; gradual smooth boundary.
AC—16 to 32 inches; pale brown (10YR 6/3) cobbly

sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; about 15 percent gravel and 15 percent cobbles; strongly acid; gradual smooth boundary.

C1—32 to 37 inches; very pale brown (10YR 7/4) gravelly sandy loam, light yellowish brown (10YR 6/4) moist; single grain; loose, nonsticky and nonplastic; about 25 percent gravel and 10 percent cobbles; strongly acid; clear irregular boundary.

C2—37 to 45 inches; yellowish brown (10YR 5/4) very cobbly loamy sand, yellowish brown (10YR 5/6) moist; single grain; loose, nonsticky and nonplastic; about 30 percent gravel, 20 percent cobbles, and 10 percent stones; strongly acid; gradual wavy boundary.

C3—45 to 60 inches; brownish yellow (10YR 6/6) very gravelly sandy loam, yellowish brown (10YR 5/6) moist; single grain; loose, nonsticky and nonplastic; about 40 percent gravel, 10 percent cobbles, and 10 percent stones; strongly acid.

A major part of the control section between depths of 10 and 20 inches has pH greater than 5.5, but some subhorizons have a pH of less than 5.5. The control section generally is gravelly sandy loam or sandy loam, but the content of clay ranges from 5 to 18 percent, that of silt from 5 to 30 percent, and that of sand from 50 to 80 percent. More than 35 percent of the sand is fine sand or coarser sand. The content of rock fragments is 20 to 35 percent. Reaction is strongly acid to slightly acid.

Miracle Series

The Miracle series consists of moderately deep, well drained soils on hills and ridges. These soils formed in residuum derived from redbed sandstone. Slope is 3 to 30 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are fine-loamy, mixed Argic Cryoborolls.

Typical pedon of Miracle loam, 3 to 30 percent slopes, about 450 feet north and 1,800 feet west of the southeast corner of sec. 28, T. 3 S., R. 85 W.

A—0 to 3 inches; reddish brown (5YR 5/3) loam, dark reddish brown (5YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; mildly alkaline; clear smooth boundary.

BA—3 to 7 inches; reddish brown (5YR 4/3) loam, dark reddish brown (5YR 3/3) moist; weak coarse subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.

Bt1—7 to 11 inches; reddish brown (5YR 5/4) sandy clay loam, dark reddish brown (5YR 3/3) moist; strong medium angular blocky structure; hard, friable, sticky and plastic; thin patchy clay films on peds; mildly alkaline; clear smooth boundary.

Bt2—11 to 18 inches; reddish brown (2.5YR 5/4) sandy clay loam, reddish brown (5YR 4/3) moist; strong medium angular blocky structure; hard, friable, sticky and plastic; thin continuous clay films on peds; mildly alkaline; abrupt smooth boundary.

C—18 to 37 inches; light reddish brown (2.5YR 5/4) fine sandy loam, red (2.5YR 5/6) moist; massive; loose, nonsticky and nonplastic; lime occurring in soft masses; calcareous in the lower 6 inches; moderately alkaline; abrupt irregular boundary.

R—37 inches; hard, red sandstone.

Bedrock is at a depth of 20 to 40 inches. The solum is 15 to 40 inches thick. The content of rock fragments is 0 to 15 percent. The A and Bt horizons are neutral or mildly alkaline.

Moen Series

The Moen series consists of moderately deep, well drained soils on uplands and valley side slopes. These soils formed in material weathered from granite and schist. Slope is 1 to 25 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 42 to 44 degrees F.

These soils are fine-loamy, mixed Typic Argiborolls.

Typical pedon of Moen stony loam, 12 to 25 percent slopes, about 1,000 feet north and 1,000 feet west of the southeast corner of sec. 19, T. 2 S., R. 86 W.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) stony loam, very dark gray (10YR 3/1) moist; moderate fine granular; soft, friable, slightly sticky and nonplastic; neutral; about 5 percent gravel, 5 percent cobbles, and 5 percent stones; clear smooth boundary.

BA—4 to 9 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; neutral; about 20 percent gravel, 5 percent cobbles, and 5 percent stones; clear wavy boundary.

Bt1—9 to 13 inches; reddish brown (5YR 4/4) gravelly sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; neutral; about 20 percent gravel, 5 percent

cobbles, and 5 percent stones; clear smooth boundary.

Bt2—13 to 22 inches; yellowish red (5YR 5/6) gravelly sandy clay loam, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; loose, friable, slightly sticky and slightly plastic; neutral; abrupt smooth boundary.

R—22 inches; hard, noncalcareous Dakota sandstone.

Bedrock is at a depth of 20 to 40 inches. The mollic epipedon is 3 to 10 inches thick. The control section is 15 to 30 percent rock fragments. The A and B horizons are slightly acid to mildly alkaline.

Monad Series

The Monad series consists of deep, well drained soils on fans and mountainsides. These soils formed in local alluvium and colluvium. Slope is 12 to 50 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 38 to 42 degrees F.

These soils are fine-loamy, mixed Argic Cryoborolls.

Typical pedon of Monad fine sandy loam, 12 to 25 percent slopes, about 750 feet south and 1,750 feet east of the northwest corner of sec. 11, T. 3 S., R. 83 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) fine sandy loam, very dark brown (10YR 3/2) moist; moderate fine crumb structure; soft, very friable, nonsticky and nonplastic; about 5 percent channery fragments and pebbles; neutral; clear smooth boundary.

A2—2 to 11 inches; grayish brown (10YR 5/2) loam, very dark brown (10YR 3/2) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; about 5 percent gravel; neutral; clear smooth boundary.

Bt1—11 to 37 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 4/3) moist; strong fine subangular blocky structure; very hard, firm, sticky and plastic; about 5 percent shale chips; neutral; clear smooth boundary.

Bt2—37 to 53 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; thin clay films on peds; about 10 percent shale chips; neutral; clear smooth boundary.

BC—53 to 60 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; thin patches of clay films on faces of peds; about 15 percent shale chips; slightly acid.

Reaction is medium acid to mildly alkaline. The Bt2 horizon is loam, sandy clay loam, or clay loam and is 25 to 35 percent clay and 5 to 35 percent coarse fragments, mainly soft shale fragments.

Mord Series

The Mord series consists of deep, well drained soils on mountainsides and valley side slopes. These soils formed in residuum and colluvium. Slope is 12 to 50 percent. The average annual precipitation is 18 to 22 inches, and the average annual air temperature is 39 to 41 degrees F.

These soils are fine, montmorillonitic Boralfic Cryoborolls.

Typical pedon of Mord fine sandy loam, in an area of Charcol-Mord complex, 25 to 50 percent slopes; in the NE¼NW¼ of sec. 35, T. 4 S., R. 83 W.

O—1 inch to 0; undecomposed leaves and needles.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark brown (7.5YR 2/2) moist; weak fine crumb structure; loose, very friable, nonsticky and nonplastic; about 10 percent gravel; neutral; clear smooth boundary.

A2—3 to 10 inches; grayish brown (10YR 5/2) fine sandy loam, dark brown (7.5YR 3/2) moist; weak fine crumb structure; soft, very friable, nonsticky and nonplastic; about 10 percent gravel; neutral; abrupt smooth boundary.

E—10 to 21 inches; pinkish white (7.5YR 8/2) sandy clay loam, pinkish gray (7.5YR 6/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; about 5 percent gravel; slightly acid; clear wavy boundary.

Bt1—21 to 40 inches; pink (7.5YR 7/4) cobbly clay, light brown (7.5YR 6/4) moist; moderate subangular blocky structure; very hard, very firm, sticky and plastic; thin continuous clay films on peds; about 15 percent cobbles and 5 percent stones; slightly acid; clear smooth boundary.

Bt2—40 to 60 inches; pinkish gray (7.5YR 7/2) cobbly clay, light brown (7.5YR 6/4) moist; moderate medium subangular blocky structure; very hard, very firm, sticky and plastic; moderate continuous clay films on peds; about 15 percent cobbles and 5 percent stones; mildly alkaline.

The mollic epipedon is 10 to 15 inches thick. The content of rock fragments is 0 to 35 percent. Hue is

10YR or 7.5YR. The Bt horizon is typically cobbly clay loam or cobbly clay.

Morval Series

The Morval series consists of deep, well drained soils on alluvial fans. These soils formed in alluvium derived dominantly from basalt. Slope is 1 to 40 percent. The average annual precipitation is 14 to 16 inches, and the average annual air temperature is 42 to 44 degrees F.

These soils are fine-loamy, mixed Aridic Argiborolls.

Typical pedon of Morval loam, in an area of Showalter-Morval complex, 5 to 15 percent slopes; about 2,500 feet south and 1,500 feet west of the northeast corner of sec. 29, T. 6 S., R. 88 W.

A—0 to 7 inches; brown (7.5YR 4/2) loam, very dark brown (7.5YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; mildly alkaline; clear smooth boundary.

Bt1—7 to 10 inches; brown (7.5YR 4/2) clay loam, dark brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; mildly alkaline; clear smooth boundary.

Bt2—10 to 19 inches; brown (7.5YR 5/4) clay loam, brown (7.5YR 4/2) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; few thin clay films on peds; about 5 percent gravel and 5 percent cobbles; mildly alkaline; clear smooth boundary.

Bk1—19 to 23 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; secondary calcium carbonate in thin seams; calcareous; moderately alkaline; about 5 percent gravel and 5 percent cobbles; clear smooth boundary.

Bk2—23 to 60 inches; white (10YR 8/2) loam, pale brown (10YR 6/3) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; about 5 percent gravel and 5 percent cobbles; calcareous; moderately alkaline.

The solum is 19 to 35 inches thick. The control section is 5 to 25 percent rock fragments. The A horizon has hue of 10YR or 7.5YR. The Bt horizon has hue of 10YR or 7.5YR. It is clay loam or loam. The Bk horizon has a calcium carbonate equivalent that ranges from 15 to 25 percent.

Moyerson Series

The Moyerson series consists of shallow, well drained soils on mountainsides and ridges. These soils formed in fine textured, calcareous materials weathered from sedimentary rocks. Slope is 15 to 60 percent. The average annual precipitation is 14 to 16 inches, and the average annual air temperature is 40 to 42 degrees F.

These soils are clayey, montmorillonitic (calcareous), frigid, shallow Ustic Torriorthents.

Typical pedon of Moyerson silty clay loam, in an area of Moyerson-Rock outcrop complex, 15 to 60 percent slopes; about 1,300 feet north and 1,700 feet east of the southwest corner of sec. 3, T. 4 S., R. 83 W.

A—0 to 5 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; calcareous; moderately alkaline; clear smooth boundary.

C1—5 to 10 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium platy structure; slightly hard, friable, slightly sticky and plastic; calcareous; mildly alkaline; clear smooth boundary.

C2—10 to 16 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak thin platy structure; slightly hard, friable, sticky and plastic; 75 to 90 percent shale chips; calcareous; mildly alkaline.

Cr—16 to 20 inches; shale.

Paralithic contact is at a depth of 10 to 20 inches. Lime is within a depth of 10 inches. Rock fragments in the particle-size control section range from 0 to 35 percent. Reaction ranges from mildly alkaline to strongly alkaline. The exchangeable sodium percentage ranges from 0 to 15. Hue is 5Y to 7.5YR.

Mussel Series

The Mussel series consists of deep, well drained soils on terraces, fans, and foot slopes. These soils formed in calcareous alluvium. Slope is 1 to 25 percent. The average annual precipitation is 13 to 14 inches, and the average annual air temperature is 42 to 44 degrees F.

These soils are fine-loamy, mixed (calcareous), frigid Ustic Torriorthents.

Typical pedon of Mussel loam, 1 to 6 percent slopes, about 1,800 feet south and 800 feet east of the northwest corner of sec. 2, T. 5 S., R. 85 W.

A—0 to 8 inches; light gray (10YR 7/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; about 5 percent gravel; moderately alkaline; clear smooth boundary.

AC—8 to 17 inches; very pale brown (10YR 7/3) sandy

clay loam, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; about 5 percent gravel; calcareous; moderately alkaline; clear smooth boundary.

Ck1—17 to 42 inches; very pale brown (10YR 7/3) sandy clay loam, brown (10YR 5/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; about 5 percent gravel; secondary calcium carbonate in thin seams; calcareous; moderately alkaline; clear smooth boundary.

Ck2—42 to 60 inches; very pale brown (10YR 7/3) gravelly sandy clay loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; about 30 percent gravel and few cobbles; secondary calcium carbonate occurring as soft masses; calcareous; moderately alkaline.

The content of rock fragments in the 10- to 20-inch control section is 5 to 20 percent and 10 to 35 percent between depths of 40 and 60 inches. The control section is 18 to 30 percent clay.

Pinelli Series

The Pinelli series consists of deep, well drained soils on fans and valley sides. These soils formed in alluvium derived dominantly from sedimentary bedrock. Slope is 1 to 25 percent. The average annual precipitation is 13 to 15 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are fine, montmorillonitic Borollic Haplargids.

Typical pedon of Pinelli loam, in an area of Tanna-Pinelli complex, 12 to 25 percent slopes; near the northwest corner of sec. 18, T. 2 S., R. 84 W.

A—0 to 7 inches; yellowish brown (10YR 5/4) loam, yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.

BA—7 to 11 inches; yellowish brown (10YR 5/4) clay loam, yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; calcareous; mildly alkaline; clear smooth boundary.

Bt—11 to 16 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure; hard, firm, sticky and plastic; about 15 percent gravel; secondary calcium carbonate in a few nodules and seams; calcareous; moderately alkaline; clear smooth boundary.

Bk1—16 to 22 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; moderate coarse subangular blocky structure; hard, firm, sticky and plastic; about 15 percent gravel; secondary calcium carbonate in seams and nodules; calcareous; moderately alkaline; clear smooth boundary.

Bk2—22 to 60 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; massive; hard, firm, slightly sticky and slightly plastic; about 15 percent gravel; secondary calcium carbonate occurring as soft nodules; calcareous; moderately alkaline.

Secondary lime is at a depth of 6 to 30 inches. The solum is 10 to 40 inches thick. The control section is 0 to 15 percent rock fragments. The content of clay is 35 to 50 percent in the Bt horizon and 18 to 35 percent in the Bk horizon. The calcium carbonate equivalent is 4 to 14 percent.

Redrob Series

The Redrob series consists of somewhat poorly drained soils on alluvial valley floors, low terraces, and flood plains along the major streams. These soils formed in mixed alluvium. Slope is 1 to 6 percent. The average annual precipitation is 16 to 18 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are fine-loamy over sandy or sandy-skeletal, mixed (calcareous), frigid Fluvaquentic Haplaquolls.

Typical pedon of Redrob loam, 1 to 6 percent slopes, in the SE¼SE¼NE¼ of sec. 34, T. 7 S., R. 88 W.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark gray (10YR 3/1) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; about 5 percent gravel and 5 percent cobbles; mildly alkaline; clear smooth boundary.

A2—5 to 14 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure parting to weak medium granular; slightly hard, very friable, nonsticky and nonplastic; about 5 percent gravel and 5 percent cobbles; calcareous; mildly alkaline; clear smooth boundary.

A3—14 to 20 inches; very dark gray (10YR 4/2), stratified stony loam, cobbly sandy loam, and sandy clay loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky

and nonplastic; about 5 percent gravel, 10 percent cobbles, and 10 percent stones; calcareous; mildly alkaline; clear wavy boundary.

2C—20 to 60 inches; brown (10YR 5/3) extremely cobbly loamy sand and sand; single grain; loose, nonsticky and nonplastic; about 15 percent gravel, 45 percent cobbles, and 3 percent stones; neutral.

The water table is usually at a depth of 18 to 30 inches. The solum is about 10 to 25 inches thick, depending on the occurrence of flooding and the amount of deposition. The A1 and A2 horizons have hue of 10YR. The C horizon has hue of 2.5YR to 7.5YR. Mottles are few to many, fine to large, and distinct or prominent.

Rentsac Series

The Rentsac series consists of shallow, well drained soils on mountain and mesa side slopes. These soils formed in residuum and colluvium derived dominantly from sandstone. Slope is 25 to 65 percent. The average annual precipitation is 10 to 15 inches, and the average annual air temperature is 42 to 45 degrees F.

These soils are loamy-skeletal, mixed (calcareous), frigid Lithic Ustic Torriorthents.

Typical pedon of Rentsac channery loam, in an area of Cushool-Rentsac complex, 15 to 65 percent slopes; about 700 feet south and 800 feet west of the northeast corner of sec. 36, T. 4 S., R. 87 W.

A1—0 to 3 inches; grayish brown (10YR 5/2) channery loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; about 15 percent channery fragments; calcareous; moderately alkaline; clear smooth boundary.

A2—3 to 6 inches; pale brown (10YR 6/3) channery loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; about 15 percent channery fragments; calcareous; moderately alkaline; clear smooth boundary.

AC—6 to 11 inches; pale brown (10YR 6/3) extremely channery loam, brown (10YR 4/3) moist; weak fine subangular blocky structure parting to weak fine granular; slightly hard, very friable, slightly sticky and nonplastic; about 65 percent channery fragments; calcareous; moderately alkaline; clear smooth boundary.

C—11 to 18 inches; pale brown (10YR 6/3) extremely channery loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; about 70 percent channery fragments; calcareous; moderately alkaline.

R—18 inches; hard sandstone.

Bedrock is at a depth of 10 to 20 inches. The control section is 50 to 70 percent rock fragments and 7 to 18 percent clay. Hue is 2.5Y to 7.5YR throughout the profile.

Rogert Series

The Rogert series consists of shallow, well drained soils on mountainsides. These soils formed in residuum derived from granite. Slope is 25 to 65 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 36 to 38 degrees F.

These soils are loamy-skeletal, mixed Lithic Cryoborolls.

Typical pedon of Rogert very stony sandy loam, 25 to 65 percent slopes, in the NE¼NE¼ of sec. 4, T. 2 S., R. 81 W.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; about 20 percent fine pebbles and 25 percent stones; slightly acid; clear wavy boundary.

A2—6 to 17 inches; brown (7.5YR 5/2) very gravelly sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; about 40 percent gravel; slightly acid; abrupt wavy boundary.

R—17 inches; hard granite.

The mollic epipedon is 7 to 20 inches thick and generally extends to the lithic contact. Some pedons have a C horizon. Bedrock is at a depth of 10 to 20 inches. The control section is 35 to 80 percent rock fragments and 5 to 18 percent clay. Hue is 2.5Y to 7.5YR.

Showalter Series

The Showalter series consists of deep, well drained soils on alluvial fans, high terraces, and valley sides. These soils formed in calcareous alluvium derived from basalt. Slope is 5 to 25 percent. The average annual precipitation is 14 to 16 inches, and the average annual air temperature is 42 to 44 degrees F.

These soils are clayey-skeletal, montmorillonitic Typic Argiborolls.

Typical pedon of Showalter very stony loam, in an area of Showalter-Morval complex, 15 to 25 percent slopes; about 2,000 feet south and 900 feet east of the northwest corner of sec. 28, T. 6 S., R. 88 W.

A—0 to 8 inches; brown (7.5YR 4/2) very stony loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; hard, friable, slightly sticky and slightly plastic; about 5 percent gravel, 5 percent cobbles, and 25 percent stones; mildly alkaline; clear smooth boundary.

Bt1—8 to 11 inches; reddish brown (5YR 4/3) very cobbly clay loam, dark reddish brown (5YR 3/3) moist; strong fine subangular blocky structure; hard, friable, sticky and plastic; few thin clay films on peds; about 10 percent gravel, 15 percent cobbles, and 10 percent stones; mildly alkaline; clear smooth boundary.

Bt2—11 to 25 inches; reddish brown (5YR 4/4) very cobbly clay, dark reddish brown (5YR 3/4) moist; strong medium subangular blocky structure parting to strong fine subangular blocky; very hard, very firm, very sticky and very plastic; thin continuous clay films on peds; about 10 percent gravel, 20 percent cobbles, and 5 percent stones; mildly alkaline; clear smooth boundary.

Bt3—25 to 39 inches; reddish brown (5YR 5/4) very cobbly clay, reddish brown (5YR 4/4) moist; moderate coarse subangular blocky structure; very hard, very firm, very sticky and very plastic, medium continuous clay films on peds; about 15 percent gravel, 20 percent cobbles, and 10 percent stones; mildly alkaline; gradual wavy boundary.

Bk—39 to 60 inches; pink (7.5YR 7/4) very cobbly clay loam, brown (7.5YR 5/4) moist; weak coarse subangular blocky structure; about 20 percent gravel, 35 percent cobbles, and 5 percent stones; common disseminated secondary calcium carbonate; calcareous; moderately alkaline.

Secondary lime is at a depth of 16 to 40 inches. The mollic epipedon is 10 to 15 inches thick. The content of rock fragments ranges from 35 to 50 percent in the upper part of the B horizon and is higher in the lower part. Hue is 5YR to 10YR.

Skylick Series

The Skylick series consists of very deep, well drained soils on complex mountainsides. These soils formed in residuum and colluvium derived dominantly from sandstone. Slope is 10 to 50 percent. The average annual precipitation is 18 to 22 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are fine-loamy, mixed Cryic Pachic Paleborolls.

Typical pedon of Skylick loam, in an area of Anvik-Skylick-Sligting association, 25 to 50 percent slopes; about 1,100 feet south and 1,700 feet east of the northwest corner of sec. 23, T. 3 S., R. 85 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; neutral; clear smooth boundary.

A2—4 to 10 inches; very dark grayish brown (10YR 3/2) loam, black (10YR 2/1) moist; weak fine and medium granular structure; very soft, friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

A3—10 to 20 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak coarse granular structure; soft, very friable, slightly sticky and slightly plastic; neutral; gradual smooth boundary.

A4—20 to 31 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; neutral; gradual smooth boundary.

Bt1—31 to 48 inches; brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; weak moderate subangular blocky structure; slightly hard, friable, sticky and plastic; neutral; gradual wavy boundary.

Bt2—48 to 60 inches; brown (10YR 4/3) gravelly sandy clay loam, very dark grayish brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few moderately thick clay films on peds; about 30 percent gravel; neutral.

The solum is more than 30 inches thick. The upper part of the Bt horizon is 24 to 35 inches thick. The A horizon is loam or silt loam. The Bt horizon is clay loam, loam, or gravelly sandy clay loam. It has hue of 10YR or 7.5YR.

Sligting Series

The Sligting series consists of deep, well drained soils on mountain slopes. These soils formed in colluvium and residuum derived dominantly from sandstone and basalt. Slope is 10 to 50 percent. The average annual precipitation is 18 to 22 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are clayey-skeletal, montmorillonitic Cryic Pachic Paleborolls.

Typical pedon of Sligting very stony loam, in an area of Anvik-Skylick-Sligting association, 25 to 50 percent slopes; about 3,200 feet north and 2,600 feet west of the southeast corner of sec. 36, T. 3 S., R. 85 W.

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) very stony loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; about 40 percent stones; neutral; clear smooth boundary.

A2—7 to 24 inches; very dark grayish brown (10YR 3/2) very stony loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, friable, nonsticky and nonplastic; about 45 percent stones; neutral; clear wavy boundary.

E—24 to 30 inches; very pale brown (10YR 7/3) extremely cobbly clay loam, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, very sticky and very plastic; about 15 percent gravel, 40 percent cobbles, and 10 percent stones; neutral; gradual irregular boundary.

E/B—30 to 36 inches; very pale brown (10YR 7/3) very cobbly clay, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, very sticky and very plastic; common moderate clay films on peds; about 20 percent gravel and 20 percent cobbles; medium acid; clear wavy boundary.

Bt—36 to 60 inches; brown (7.5YR 5/4) very stony clay, brown (7.5YR 4/4) moist; strong medium subangular blocky structure; very hard, very firm, very sticky and very plastic; many moderately thick clay films on peds and rock fragments; about 10 percent gravel, 15 percent cobbles, and 15 percent stones; medium acid.

The mollic epipedon is 24 to 30 inches thick. The combined thickness of the A, E, and Bt horizons is 50 inches or more. Depth to the upper boundary of the Bt horizon is 35 to 45 inches. The Bt horizon ranges from very stony clay loam to very stony clay. The content of rock fragments in this horizon is 35 to 70 percent, and that of clay is 35 to 55 percent.

Southace Series

The Southace series consists of deep, well drained soils on fans, terraces, and mountainsides. These soils formed in calcareous, stony colluvium and alluvium. Slope is 1 to 65 percent. The average annual precipitation is 14 to 16 inches, and the average annual air temperature is 42 to 46 degrees F.

These soils are loamy-skeletal, mixed (calcareous), frigid Ustic Torriorthents.

Typical pedon of Southace very stony sandy loam, in an area of Dahlquist-Southace complex, 25 to 50 percent slopes; about 2,300 feet south and 300 feet east of the northwest corner of sec. 3, T. 5 S., R. 85 W.

A—0 to 3 inches; brown (10YR 5/3) very stony sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; about 5 percent gravel, 25 percent cobbles, and 15 percent stones; calcareous; moderately alkaline; clear smooth boundary.

AC—3 to 10 inches; light brown (7.5YR 6/4) very stony sandy loam, brown (7.5YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; about 25 percent cobbles and 15 percent stones; calcareous; moderately alkaline; clear smooth boundary.

Ck1—10 to 22 inches; pink (7.5YR 7/4) extremely stony sandy loam, brown (7.5YR 5/4) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; about 10 percent gravel, 40 percent cobbles, and 30 percent stones; lime disseminated and occurring as coatings on rock fragments; calcareous; moderately alkaline; gradual smooth boundary.

Ck2—22 to 60 inches; pink (7.5YR 7/4) extremely stony loamy coarse sand, brown (7.5YR 5/4) moist; moderate fine granular structure; hard, friable, nonsticky and nonplastic; about 5 percent gravel, 40 percent cobbles, and 35 percent stones; lime disseminated and occurring as coatings on rock fragments; calcareous; moderately alkaline.

Lime is at a depth of 0 to 5 inches. The A horizon has hue of 10YR to 5YR. The C horizon has hue of 7.5YR or 5YR.

Starley Series

The Starley series consists of shallow, well drained soils on uplands, ridgetops, and mountainsides. These soils formed in residuum and colluvium derived dominantly from calcareous sandstone. Slope is 3 to 25 percent. The average annual precipitation is 16 to 19 inches, and the average annual air temperature is 38 to 42 F.

These soils are loamy-skeletal, mixed Lithic Cryoborolls.

Typical pedon of Starley very channery loam, in an area of Starley-Starman very channery loams, 3 to 25 percent slopes; about 2,700 feet west and 1,200 feet north of the southeast corner of sec. 19, T. 3 S., R. 86 W.

A—0 to 8 inches; brown (10YR 4/3) very channery loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; about 40 percent channery

fragments; calcareous; mildly alkaline; clear smooth boundary.

Bw—8 to 13 inches; brown (10YR 5/3) channery clay loam, dark grayish brown (10YR 4/2) moist; moderate medium and fine subangular blocky structure; hard, friable, sticky and plastic; about 30 percent channery fragments; calcareous; moderately alkaline; clear smooth boundary.

BC—13 to 15 inches; pale brown (10YR 6/3) very channery loam, dark brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; about 35 percent shale and sandstone channery fragments; calcareous; moderately alkaline; clear smooth boundary.

C—15 to 19 inches; very pale brown (10YR 7/4) very channery loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and slightly plastic; about 45 percent shale and sandstone channery fragments; calcareous; moderately alkaline; clear wavy boundary.

R—19 inches; hard sandstone.

Bedrock is at a depth of 8 to 20 inches. Secondary lime is at a depth of 0 to 8 inches.

Starman Series

The Starman series consists of shallow, well drained soils on ridges. These soils formed in residuum and colluvium derived dominantly from hard shale and sandstone. Slope is 3 to 25 percent. The average annual precipitation is 16 to 19 inches, and the average annual air temperature is 38 to 42 degrees F.

These soils are loamy-skeletal, mixed (calcareous) Lithic Cryorthents.

Typical pedon of Starman very channery loam, in an area of Starley-Starman very channery loams, 3 to 25 percent slopes; about 2,700 feet west and 200 feet south of the northeast corner of sec. 30, T. 3 S., R. 86 W.

A—0 to 6 inches; yellowish brown (10YR 5/4) very channery loam, dark yellowish brown (10YR 4/4) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; about 35 percent channery fragments; calcareous; moderately alkaline; clear smooth boundary.

C1—6 to 10 inches; pale yellow (2.5Y 7/4) very channery loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; about 40 percent fine channery fragments; calcareous; moderately alkaline; clear smooth boundary.

C2—10 to 16 inches; pale yellow (2.5Y 8/4) very channery loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; about 60 percent channery fragments; calcareous; moderately alkaline; clear smooth boundary.

R—16 inches; calcareous shale and sandstone.

Bedrock is at a depth of 6 to 20 inches. The content of rock fragments in the control section is 45 to 60 percent. Hue is 5Y to 7.5YR.

Tanna Series

The Tanna series consists of moderately deep, well drained soils on fans and valley sides. These soils formed in alluvium and residuum derived dominantly from shale. Slope is 1 to 25 percent. The average annual precipitation is 13 to 15 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are fine, montmorillonitic Aridic Argiborolls.

Typical pedon of Tanna silt loam, in an area of Tanna-Pinelli complex, 12 to 25 percent slopes; about 150 feet south and 1,100 feet east of the northwest corner of sec. 4, T. 4 S., R. 83 W.

A—0 to 3 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; calcareous; mildly alkaline; clear smooth boundary.

Bt1—3 to 7 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; calcareous; mildly alkaline; clear smooth boundary.

Bt2—7 to 13 inches; brown (10YR 5/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; calcareous; mildly alkaline; clear smooth boundary.

Btk—13 to 18 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate and strong subangular blocky structure; very hard, firm, sticky and plastic; thin continuous clay films on peds; few nodules of secondary calcium carbonate; calcareous; moderately alkaline; clear smooth boundary.

Bk1—18 to 24 inches; light yellowish brown (2.5Y 6/4) silty clay loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; thin

discontinuous clay films on peds; lime in soft nodules and thin seams; calcareous; moderately alkaline; clear smooth boundary.

Bk2—24 to 31 inches; light yellowish brown (10YR 6/4) silty clay loam, olive brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; about 70 percent shale channery fragments; lime in seams and occurring as coatings on shale fragments; calcareous; moderately alkaline; clear wavy boundary.

Cr—31 inches; shale.

Paralithic contact is at a depth of 20 to 40 inches. The mollic epipedon is 7 to 12 inches thick. Lime is within a depth of 11 inches. Hue is 10YR or 2.5Y. The Bt horizon is clay loam, silty clay loam, or clay. The content of clay in this horizon is 35 to 45 percent.

The Tanna soils in this survey area are taxadjuncts to the Tanna series because they are calcareous in the upper 11 inches. This difference, however, does not affect the use and management of the soils.

Tridell Series

The Tridell series consists of deep, somewhat excessively drained soils on terraces and mountainsides. These soils formed in alluvium and colluvium derived dominantly from basalt. Typically, 5 to 10 percent of the surface is covered with stones. Slope is 12 to 50 percent. The average annual precipitation is 12 to 15 inches, and the average annual air temperature is 42 to 44 degrees F.

These soils are loamy-skeletal, mixed Aridic Calciborolls.

Typical pedon of Tridell stony sandy loam, in an area of Tridell-Brownsto stony sandy loams, 12 to 50 percent slopes, extremely stony; about 2,590 feet south and 750 feet west of the northeast corner of sec. 19, T. 4 S., R. 85 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) stony sandy loam, very dark brown (10YR 3/2) moist; weak thin platy structure; soft, very friable, nonsticky and nonplastic; about 20 percent gravel and 12 percent stones; calcareous; moderately alkaline; clear wavy boundary.

A2—2 to 9 inches; grayish brown (10YR 5/2) very cobbly fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; about 40 percent cobbles; calcareous; moderately alkaline; clear wavy boundary.

Ck1—9 to 14 inches; pale brown (10YR 6/3) very cobbly fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly sticky and nonplastic; about 35 percent cobbles and 10 percent stones; calcium carbonate occurring as coatings on coarse fragments; calcareous; moderately alkaline; clear wavy boundary.

Ck2—14 to 25 inches; very pale brown (10YR 7/4) cobbly sandy loam, light yellowish brown (10YR 6/4) moist; weak fine subangular blocky structure; nonsticky and nonplastic; about 25 percent cobbles and 5 percent stones; calcium carbonate occurring as coatings on coarse fragments; calcareous; moderately alkaline; gradual wavy boundary.

2Ck3—25 to 37 inches; very pale brown (10YR 7/4) very stony fine sandy loam, light yellowish brown (10YR 6/4) moist; weak medium subangular blocky structure; slightly sticky and nonplastic; about 30 percent cobbles and 20 percent stones; calcium carbonate occurring as coatings on coarse fragments; calcareous; moderately alkaline; gradual wavy boundary.

3Ck4—37 to 60 inches; light gray (10YR 7/2) very stony loamy sand, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; nonsticky and nonplastic; about 20 percent cobbles and 30 percent stones; calcium carbonate occurring as coatings on coarse fragments; calcareous; moderately alkaline.

The content of rock fragments in the 10- to 40-inch control section is 35 to 80 percent, by volume, and commonly averages about 40 percent. A calcic horizon occurs at a depth of 7 to 24 inches. The A horizon has hue of 10YR or 7.5YR. The content of rock fragments in the upper part of the Ck horizon is 15 to 45 percent. The lower part of the Ck horizon is stratified and has 15 to 70 percent rock fragments.

Uracca Series

The Uracca series consists of deep, well drained soils on alluvial fans, terraces, and valley sides. These soils formed in alluvium derived from igneous and metamorphic rocks. Typically, 3 to 15 percent of the surface is covered with boulders, stones, cobbles, and gravel. Slope is 1 to 65 percent. The average annual precipitation is 16 to 19 inches, and the average annual air temperature is 40 to 43 degrees F.

These soils are loamy-skeletal, mixed Aridic Argiborolls.

Typical pedon of Uracca cobbly sandy loam, in an area of Uracca, moist-Mergel complex, 1 to 6 percent slopes, extremely stony; about 600 feet south and 1,600 feet west of the northeast corner of sec. 8, T. 9 S., R. 85 W.

A—0 to 3 inches; brown (7.5YR 5/2) cobbly sandy loam, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine granular; soft, friable, nonsticky and nonplastic; about 25 percent cobbles and 5 percent stones; mildly alkaline; clear smooth boundary.

BA—3 to 8 inches; brown (7.5YR 5/2) cobbly sandy loam, dark brown (7.5YR 3/2) moist; moderate fine subangular blocky structure parting to moderate fine granular; slightly hard, friable, nonsticky and nonplastic; about 25 percent cobbles and 5 percent stones; mildly alkaline; clear smooth boundary.

Bt—8 to 15 inches; brown (7.5YR 5/2) very cobbly sandy clay loam, brown (7.5YR 4/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; thin patchy clay films on peds and coarse fragments; about 35 percent cobbles and 10 percent stones; mildly alkaline; clear smooth boundary.

Ck—15 to 60 inches; brown (7.5YR 5/4) extremely cobbly loamy sand, brown (7.5YR 4/2) moist; single grain; loose, nonsticky and nonplastic; about 15 percent gravel, 40 percent cobbles, and 10 percent stones; calcium carbonate coatings on coarse fragments; calcareous; moderately alkaline.

Lime is at a depth of 6 to 40 inches. The content of rock fragments is 35 to 70 percent. Hue is 2.5YR to 7.5YR. The Bt horizon is cobbly or very cobbly sandy clay loam, loam, or clay loam. The content of clay in the C horizon is less than 18 percent.

Vandamore Series

The Vandamore series consists of moderately deep, well drained soils on mountainsides. These soils formed in residuum and colluvium derived dominantly from sandstone. Slope is 25 to 65 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 38 to 42 degrees F.

These soils are loamy-skeletal, mixed (calcareous) Typic Cryorthents.

Typical pedon of Vandamore channery sandy loam, 25 to 65 percent slopes, about 360 feet north and 900 feet west of the southeast corner of sec. 35, T. 4 S., R. 82 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) channery sandy loam, dark grayish brown (10YR 4/2) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; about 20 percent channery fragments; secondary calcium carbonate coatings on the underside of rock fragments; calcareous; moderately alkaline; clear wavy boundary.

A2—2 to 7 inches; grayish brown (10YR 5/2) channery sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; about 25 percent channery fragments; secondary calcium carbonate coatings on the underside of rock fragments; calcareous; moderately alkaline; clear wavy boundary.

Ck1—7 to 13 inches; pale brown (10YR 6/3) very channery loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and nonplastic; about 50 percent channery fragments; secondary calcium carbonate coatings on rock fragments; calcareous; moderately alkaline; clear wavy boundary.

Ck2—13 to 21 inches; pale brown (10YR 6/3) very channery fine sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and nonplastic; about 30 percent channery fragments; secondary calcium carbonate coatings on rock fragments; calcareous; moderately alkaline; clear wavy boundary.

Ck3—21 to 27 inches; light gray (10YR 7/2) very channery fine sandy loam, light brownish gray (10YR 6/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; about 40 percent channery fragments; secondary calcium carbonate coatings on rock fragments; calcareous; moderately alkaline; clear wavy boundary.

R—27 inches; fine-grained sandstone.

Bedrock is at a depth of 20 to 40 inches. The content of rock fragments in the control section is 35 to 80 percent, and that of clay is 6 to 25 percent. Lime is at a depth of 0 to 2 inches. Hue is 7.5YR to 2.5Y.

Woodhall Series

The Woodhall series consists of moderately deep, well drained soils on mountainsides and ridges. These soils formed in noncalcareous, stony material derived dominantly from sandstone and basalt. Slope is 6 to 50 percent. The average annual precipitation is 18 to 22 inches, and the average annual air temperature is 38 to 40 degrees F.

These soils are loamy-skeletal, mixed Argic Cryoborolls.

Typical pedon of Woodhall gravelly loam, 6 to 50 percent slopes, extremely stony, about 2,000 feet north and 200 feet east of the southwest corner of sec. 36, T. 2 S., R. 85 W.

A—0 to 5 inches; brown (7.5YR 4/2) gravelly loam, dark brown (7.5YR 3/2) moist; moderate fine and very fine granular structure; soft, very friable, nonsticky

and nonplastic; about 28 percent gravel; mildly alkaline; clear smooth boundary.

BA—5 to 13 inches; brown (7.5YR 4/2) very gravelly loam, dark brown (7.5YR 3/2) moist; moderate coarse granular structure; slightly hard, very friable, slightly sticky and plastic; about 30 percent gravel and 10 percent cobbles; neutral; clear smooth boundary.

Bt1—13 to 20 inches; brown (7.5YR 4/4) extremely cobbly clay loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; about 15 percent gravel and 50 percent cobbles; neutral; clear irregular boundary.

Bt2—20 to 25 inches; light brown (7.5YR 6/4) extremely cobbly clay loam, brown (7.5YR 5/4) moist; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; about 20 percent gravel and 50 percent cobbles; neutral; clear smooth boundary.

R—25 inches; hard sandstone.

Bedrock is at a depth of 20 to 40 inches. The mollic epipedon is 7 to 15 inches thick. The content of rock fragments is 35 to 75 percent. The soils are normally noncalcareous throughout but have inconsistent accumulations of secondary carbonate above the bedrock in some pedons. Hue is 5Y to 7.5YR. The content of clay in the Bt horizon is 18 to 35 percent.

Woosley Series

The Woosley series consists of moderately deep, well drained soils on mountain benches. These soils formed in material weathered from sandstone. Slope is 3 to 30 percent. The average annual precipitation is 15 to 18 inches, and the average annual air temperature is 40 to 42 degrees F.

These soils are fine-loamy, mixed Argic Cryoborolls.

Typical pedon of Woosley loam, 3 to 30 percent slopes, 1,050 feet south and 1,500 feet east of the northwest corner of sec. 2, T. 2 S., R. 85 W.

A—0 to 4 inches; brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and very fine granular structure; soft, very friable, nonsticky and slightly plastic; mildly alkaline; clear smooth boundary.

Bt1—4 to 10 inches; brown (7.5YR 4/4) clay loam, dark brown (7.5YR 3/2) moist; strong medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; mildly alkaline; clear wavy boundary.

Bt2—10 to 20 inches; strong brown (7.5YR 4/6) clay loam, brown (7.5YR 4/4) moist; strong medium subangular blocky structure; slightly hard, firm, sticky and plastic; mildly alkaline; clear wavy boundary.

Btk—20 to 25 inches; strong brown (7.5YR 4/6) clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, firm, very sticky and very plastic; mildly alkaline; abrupt wavy boundary.

R—25 inches; hard sandstone bedrock.

Bedrock is at a depth of 20 to 40 inches.

Yamo Series

The Yamo series consists of deep, well drained soils on fans and toe slopes. These soils formed in colluvium. Slope is 1 to 25 percent. The average annual precipitation is 10 to 14 inches, and the average annual air temperature is 40 to 44 degrees F.

These soils are fine-loamy, mixed Borollic Camborthids.

Typical pedon of Yamo loam, 6 to 12 percent slopes, about 300 feet north of the center of sec. 6, T. 5 S., R. 84 W.

A—0 to 8 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; calcareous; moderately alkaline; clear smooth boundary.

Bw—8 to 14 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; about 10 percent cobbles; calcareous; moderately alkaline; gradual smooth boundary.

C—14 to 20 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; about 14 percent cobbles; calcium carbonate in few fine seams; calcareous; moderately alkaline; clear smooth boundary.

Ck—20 to 60 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; hard, friable, sticky and slightly plastic; about 10 percent cobbles; few soft nodules of secondary calcium carbonate; calcareous; moderately alkaline.

The solum is 11 to 20 inches thick. Some pedons are noncalcareous in the upper 8 to 12 inches, but others are calcareous throughout. The content of rock fragments ranges from 0 to 15 percent throughout the

profile. These fragments are mainly cobbles. The Ck horizon has few or common masses of segregated lime.

Yeljack Series

The Yeljack series consists of deep, well drained soils on mountain slopes and benches. These soils formed in alluvium derived from sandstone and loess. Slope is 12 to 65 percent. The average annual precipitation is 18 to 20 inches, and the average annual air temperature is 39 to 41 degrees F.

These soils are fine-loamy, mixed Cryic Pachic Paleborolls.

Typical pedon of Yeljack silt loam, in an area of Yeljack-Callings complex, 12 to 25 percent slopes; about 2,000 feet north and 750 feet east of the southwest corner of sec. 3, T. 10 S., R. 85 W.

A1—0 to 3 inches; dark brown (7.5YR 4/2) silt loam, dark reddish brown (5YR 2.5/2) moist; weak fine crumb structure; soft, very friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

A2—3 to 10 inches; dark brown (7.5YR 4/2) silt loam, dark reddish brown (5YR 2.5/2) moist; weak coarse prismatic structure parting to weak medium and fine granular; soft, friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

A3—10 to 24 inches; dark brown (7.5YR 4/2) silty clay loam, dark brown (7.5YR 3/2) moist; weak medium prismatic structure parting to weak medium and fine granular; soft, friable, slightly sticky and slightly plastic; neutral; abrupt wavy boundary.

E—24 to 32 inches; light reddish brown (5YR 6/3) clay loam, reddish brown (5YR 4/3) moist; weak coarse and medium subangular blocky structure; soft, friable, sticky and plastic; neutral; clear wavy boundary.

Bt1—32 to 40 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; medium nearly continuous clay films on peds; neutral; clear smooth boundary.

Bt2—40 to 60 inches; reddish brown (5YR 4/4) clay loam, reddish brown (5YR 4/3) moist; moderate medium angular blocky structure; very hard, firm, very sticky and plastic; medium nearly continuous clay films on peds; neutral.

The mollic epipedon is 20 to 32 inches thick. Depth to the upper boundary of the Bt horizon is 24 to 39 inches. The solum is 45 to more than 60 inches thick.

The A horizon has hue of 10YR to 5YR. The content of rock fragments in the Bt horizon is 0 to 20 percent. This horizon has hue of 5YR or 2.5YR. In some pedons a C horizon is at a depth of 45 to more than 60 inches.

Youga Series

The Youga series consists of deep, well drained soils on upland hills and mountainsides. These soils formed in alluvium and colluvium derived dominantly from basalt. Slope is 12 to 30 percent. The average annual precipitation is 19 to 21 inches, and the average annual air temperature is 36 to 38 degrees F.

These soils are fine-loamy, mixed Argic Cryoborolls.

Typical pedon of Youga loam, 12 to 30 percent slopes, about 800 feet south and 2,100 feet west of the northeast corner of sec. 23, T. 3 S., R. 85 W.

A—0 to 4 inches; very dark brown (10YR 2/2) loam, black (10YR 2/1) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; neutral; clear smooth boundary.

BA—4 to 12 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; neutral; clear wavy boundary.

Bt—12 to 28 inches; dark yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; thin continuous clay films on peds; neutral; clear wavy boundary.

BC—28 to 36 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; about 20 percent gravel; neutral; clear smooth boundary.

C1—36 to 48 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; mildly alkaline; about 20 percent gravel; clear wavy boundary.

C2—48 to 60 inches; yellowish brown (10YR 5/4) gravelly clay loam, brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; about 25 percent gravel; mildly alkaline.

The content of rock fragments is 0 to 35 percent. The solum ranges from slightly acid to mildly alkaline. Hue is 5Y to 7.5YR. The Bt horizon is loam or clay loam and has 18 to 35 percent clay.

Zillman Series

The Zillman series consists of deep, well drained soils on mountainsides. These soils formed in colluvium and residuum derived dominantly from sandstone. Slope is 25 to 65 percent. The average annual

precipitation is 13 to 15 inches, and the average annual air temperature is 40 to 41 degrees F.

These soils are loamy-skeletal, mixed Aridic Argiborolls.

Typical pedon of Zillman very flaggy loam, 25 to 65 percent slopes, about 1,700 feet north and 2,200 feet west of the southeast corner of sec. 25, T. 4 S., R. 87 W.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) very flaggy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; about 10 percent channery fragments and 25 percent flagstones; mildly alkaline; clear wavy boundary.

A2—5 to 12 inches; dark grayish brown (10YR 4/2) channery fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; about 15 percent channery fragments and 5 percent flagstones; calcareous; mildly alkaline; clear wavy boundary.

Bt—12 to 24 inches; grayish brown (2.5Y 5/2) very channery clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; about 50 percent channery fragments and 5 percent flagstones; mildly alkaline; clear wavy boundary.

Ck1—24 to 36 inches; light brownish gray (2.5Y 6/2) very channery clay loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; about 45 percent channery fragments and 10 percent flagstones; secondary calcium carbonate coatings on rock fragments; calcareous; moderately alkaline; gradual wavy boundary.

Ck2—36 to 45 inches; grayish brown (2.5Y 5/2) very channery clay loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; about 50 percent channery fragments and 10 percent flagstones; secondary calcium carbonate coatings on rock fragments; calcareous; moderately alkaline; gradual wavy boundary.

Ck3—45 to 60 inches; light olive gray (5Y 6/2) very channery loam, olive gray (5Y 5/2) moist; massive; slightly hard, firm, nonsticky and slightly plastic; about 40 percent channery fragments and 15 percent flagstones; secondary calcium carbonate coatings on rock fragments, calcareous; moderately alkaline.

Secondary lime is at a depth of 8 to 24 inches. The mollic epipedon is 7 to 20 inches thick. The solum is 15 to 30 inches thick. The control section is 35 to 80 percent rock fragments. Hue is 5Y to 7.5YR.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge onto a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Brush management. Use of mechanical, chemical, or biological methods to reduce or eliminate competition of woody vegetation to allow understory grasses and forbs to recover or to make conditions favorable for reseeding. It increases production of forage, which reduces the hazard of erosion. Brush management may improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting

capacity of a soil as compared to that of a standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation by use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles 2 millimeters to 38 centimeters (15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent of these rock fragments, and extremely cobbly soil material is more than 60 percent.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Congeliturbate. Soil material disturbed by frost action.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle

pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops using a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil. Crop residue management helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly

pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Droughty. The soil holds too little water for plants during dry periods.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and produced by erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salt (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil

moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic

numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or

saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, or other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesa. A broad, nearly flat-topped and commonly isolated upland mass characterized by summit widths that are greater than the heights of bounding erosional scarps.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with a relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Prescribed burning. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildife, grazing, or fire hazard reduction purposes.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor, on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redbeds. Sedimentary strata mainly red in color and composed largely of sandstone and shale.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material

that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a

drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $Ca^+ + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff

so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

Month	Temperature						Precipitation			
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more
	°F	°F	°F	°F	°F	Units	In	In	In	
Recorded in the period 1900-88 at Glenwood Springs										
January----	36.9	11.0	24.0	53	-16	0	1.47	0.65	2.17	4
February---	42.5	16.2	29.3	60	-12	5	1.63	.46	2.57	4
March------	50.8	23.9	37.4	71	1	54	1.48	.57	2.24	5
April------	61.4	30.9	46.2	80	14	206	1.65	.76	2.41	5
May--------	71.9	38.0	54.9	88	24	462	1.38	.61	2.07	4
June-------	82.4	43.7	63.0	96	31	684	1.13	.42	1.77	3
July-------	88.4	50.3	69.3	99	38	893	1.30	.60	1.94	3
August-----	86.0	49.2	67.6	97	37	845	1.54	.82	2.17	5
September--	78.2	41.4	59.8	92	27	592	1.53	.57	2.36	4
October----	66.4	31.7	49.1	83	17	285	1.42	.57	2.17	4
November---	50.0	22.1	36.0	69	0	36	1.11	.51	1.68	3
December---	38.2	13.3	25.8	56	-11	2	1.34	.64	1.94	4
Yearly:										
Average--	62.8	31.0	46.9	---	---	---	---	---	---	---
Extreme--	102.0	-38.0	---	99	-19	---	---	---	---	---
Total----	---	---	---	---	---	4,066	16.97	11.06	19.67	48
Recorded in the period 1948-88 at Eagle										
January----	34.1	3.0	18.5	54	-30	1	0.88	0.26	1.38	2
February---	40.0	8.6	24.3	58	-23	1	.57	.29	.82	1
March------	47.4	18.5	32.9	68	-7	18	.82	.40	1.18	2
April------	58.2	25.4	41.8	77	7	113	.79	.30	1.21	2
May--------	69.0	33.1	51.0	85	18	346	.85	.31	1.30	2
June-------	79.9	39.3	59.6	93	26	587	.88	.22	1.40	2
July-------	86.0	46.0	66.0	95	34	806	1.19	.57	1.72	3
August-----	83.3	44.3	63.8	94	31	737	1.06	.52	1.53	3
September--	75.8	35.6	55.7	91	20	471	1.10	.37	1.71	3
October----	63.9	25.4	44.7	81	9	178	.93	.35	1.50	2
November---	46.9	15.3	31.1	66	-13	13	.71	.35	1.02	2
December---	35.4	5.0	20.2	55	-24	1	.91	.38	1.36	2
Yearly:										
Average--	60.0	25.0	42.5	---	---	---	---	---	---	---
Extreme--	99.0	-51.0	---	96	-33	---	---	---	---	---
Total----	---	---	---	---	---	3,270	10.69	6.82	13.36	26

See footnote at end of table.

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

Month	Temperature						Precipitation			
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more
	°F	°F	°F	°F	°F	Units	In	In	In	
Recorded in the period 1948-80 at Aspen										
January----	33.4	7.4	20.4	52	-20	0	1.81	0.96	2.56	6
February---	37.3	9.9	23.6	55	-17	1	1.55	.91	2.13	5
March------	42.5	15.6	29.0	61	-9	7	1.89	1.10	2.59	5
April------	52.7	24.5	38.6	70	5	69	1.64	.96	2.26	5
May--------	63.5	32.7	48.1	79	17	263	1.44	.77	2.03	4
June-------	73.7	38.9	56.3	87	26	483	1.26	.38	1.97	3
July-------	79.7	44.9	62.3	89	34	686	1.51	.86	2.09	4
August-----	77.4	43.2	60.3	88	31	625	1.80	1.15	2.39	5
September--	70.4	36.6	53.5	85	21	401	1.58	.61	2.39	4
October----	60.2	28.3	44.3	75	9	177	1.48	.72	2.23	4
November---	44.1	17.4	30.7	64	-9	14	1.55	1.03	2.03	5
December---	34.6	9.0	21.8	53	-14	1	1.87	.86	2.74	6
Yearly:										
Average--	55.8	25.7	40.7	---	---	---	---	---	---	---
Extreme--	93.0	-33.0	---	90	-22	---	---	---	---	---
Total----	---	---	---	---	---	2,725	19.39	11.46	23.83	56

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Recorded in the period 1902-88 at Glenwood Springs			
Last freezing temperature in spring:			
1 year in 10 later than--	May 5	May 26	June 11
2 years in 10 later than--	Apr. 29	May 18	June 4
5 years in 10 later than--	Apr. 18	May 4	May 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 4	Sept. 15	Sept. 7
2 years in 10 earlier than--	Oct. 10	Sept. 22	Sept. 13
5 years in 10 earlier than--	Oct. 20	Oct. 6	Sept. 24
Recorded in the period 1948-88 at Eagle			
Last freezing temperature in spring:			
1 year in 10 later than--	May 31	June 9	June 24
2 years in 10 later than--	May 25	June 4	June 20
5 years in 10 later than--	May 14	May 26	June 13
First freezing temperature in fall:			
1 year in 10 earlier than--	Sept. 14	Sept. 1	Aug. 20
2 years in 10 earlier than--	Sept. 19	Sept. 6	Aug. 26
5 years in 10 earlier than--	Sept. 27	Sept. 16	Sept. 5

TABLE 2.--FREEZE DATES IN SPRING AND FALL--Continued

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Recorded in the period 1948-80 at Aspen			
Last freezing temperature in spring:			
1 year in 10 later than--	June 5	June 18	June 25
2 years in 10 later than--	May 29	June 12	June 21
5 years in 10 later than--	May 16	May 30	June 12
First freezing temperature in fall:			
1 year in 10 earlier than--	Sept. 18	Sept. 8	Aug. 20
2 years in 10 earlier than--	Sept. 23	Sept. 13	Aug. 26
5 years in 10 earlier than--	Oct. 2	Sept. 21	Sept. 5

TABLE 3.--GROWING SEASON

Probability	Daily minimum temperature		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
Recorded in the period 1902-88 at Glenwood Springs			
9 years in 10	142	115	97
8 years in 10	151	126	106
5 years in 10	169	148	124
2 years in 10	186	169	142
1 year in 10	195	180	151
Recorded in the period 1948-88 at Eagle			
9 years in 10	99	86	50
8 years in 10	107	93	60
5 years in 10	123	107	80
2 years in 10	139	120	99
1 year in 10	147	128	110
Recorded in the period 1948-80 at Aspen			
9 years in 10	103	79	53
8 years in 10	111	88	63
5 years in 10	125	105	80
2 years in 10	140	123	98
1 year in 10	148	132	107

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Eagle County	Garfield County	Pitkin County	Total-- Area	Extent
		Acres	Acres	Acres	Acres	Pct
1	Acree very stony sandy loam, 3 to 12 percent slopes	369	0	0	369	0.1
2	Acree very stony sandy loam, 12 to 25 percent slopes	413	0	0	413	0.1
3	Acree loam, 3 to 6 percent slopes	1,455	137	183	1,775	0.3
4	Acree loam, 6 to 12 percent slopes	820	1,184	325	2,329	0.4
5	Acree loam, 12 to 25 percent slopes	2,750	65	289	3,104	0.5
6	Almy loam, 1 to 12 percent slopes	5,740	3,881	102	9,723	1.5
7	Almy loam, 12 to 25 percent slopes	1,890	811	290	2,991	0.5
8	Ansel-Anvik association, 12 to 25 percent slopes	590	1,578	37	2,205	0.3
9	Ansel-Anvik association, 25 to 45 percent slopes	6,820	1,611	2,859	11,290	1.8
10	Anvik-Skylick-Sligting association, 10 to 25 percent slopes	8,133	1,538	791	10,462	1.6
11	Anvik-Skylick-Sligting association, 25 to 50 percent slopes	18,410	3,135	5,963	27,508	4.3
12	Arle-Ansari-Rock outcrop complex, 12 to 50 percent slopes	5,068	3,807	1,868	10,743	1.7
13	Atencio-Azeltine complex, 3 to 6 percent slopes	2,550	3,585	480	6,615	1.0
14	Callings-Yeljack complex, 25 to 65 percent slopes	2,614	0	2,343	4,957	0.8
15	Charcol-Mord complex, 12 to 25 percent slopes	237	0	0	237	*
16	Charcol-Mord complex, 25 to 50 percent slopes	600	0	0	600	0.1
17	Cochetopa-Antrobus association, 6 to 12 percent slopes	3,807	73	0	3,880	0.6
18	Cochetopa-Antrobus association, 12 to 25 percent slopes	16,842	5,061	0	21,903	3.4
19	Cochetopa-Antrobus association, 25 to 50 percent slopes	10,216	2,636	0	12,852	2.0
20	Coulterg loam, 12 to 50 percent slopes	6,112	130	0	6,242	1.0
21	Curecanti-Fughes complex, 6 to 12 percent slopes	1,031	0	0	1,031	0.2
22	Curecanti-Fughes complex, 12 to 25 percent slopes	2,951	0	0	2,951	0.5
23	Cushool fine sandy loam, 12 to 25 percent slopes	781	0	0	781	0.1
24	Cushool fine sandy loam, 25 to 50 percent slopes	780	0	0	780	0.1
25	Cushool-Rentsac complex, 15 to 65 percent slopes	21,341	1,721	4,583	27,645	4.3
26	Dahlquist-Southace complex, 6 to 12 percent slopes	2,086	0	0	2,086	0.3
27	Dahlquist-Southace complex, 12 to 25 percent slopes	729	56	0	785	0.1
28	Dahlquist-Southace complex, 25 to 50 percent slopes	2,488	742	0	3,230	0.5
29	Dollard-Rock outcrop, shale complex, 12 to 25 percent slopes	1,425	49	862	2,336	0.4
30	Dollard-Rock outcrop, shale complex, 25 to 65 percent slopes	3,174	175	13,844	17,193	2.7
31	Dotsero gravelly sandy loam, 5 to 25 percent slopes	1,212	0	0	1,212	0.2
32	Dotsero sandy loam, 1 to 12 percent slopes	1,690	0	0	1,690	0.3
33	Earsman-Rock outcrop complex, 12 to 65 percent slopes	16,799	5,188	6,085	28,072	4.4
34	Empedrado loam, 2 to 6 percent slopes	537	5,261	260	6,058	0.9
35	Empedrado loam, 6 to 12 percent slopes	738	5,225	801	6,764	1.1
36	Empedrado loam, 12 to 25 percent slopes	156	525	32	713	0.1
37	Etoe loam, 15 to 50 percent slopes	0	887	0	887	0.1
38	Evanston loam, 1 to 6 percent slopes	1,371	879	781	3,031	0.5
39	Evanston loam, 6 to 25 percent slopes	2,841	894	534	4,269	0.7
40	Evanston loam, 25 to 45 percent slopes	4,400	1,528	1,631	7,559	1.2
41	Evanston loam, 45 to 65 percent slopes	125	0	642	767	0.1
42	Fluvaquents, 0 to 10 percent slopes	3,348	1,127	1,455	5,930	0.9
43	Forelle-Brownsto complex, 6 to 12 percent slopes	3,731	726	0	4,457	0.7
44	Forelle-Brownsto complex, 12 to 25 percent slopes	8,804	695	0	9,499	1.5
45	Forsey cobbly loam, 3 to 12 percent slopes	1,475	0	19	1,494	0.2
46	Forsey cobbly loam, 12 to 25 percent slopes	6,123	142	1,612	7,877	1.2
47	Forsey cobbly loam, 25 to 65 percent slopes	7,788	621	3,397	11,806	1.8
48	Fughes stony loam, 3 to 12 percent slopes	162	679	0	841	0.1
49	Goslin fine sandy loam, 3 to 6 percent slopes	1,920	383	389	2,692	0.4
50	Goslin fine sandy loam, 6 to 25 percent slopes	3,245	81	888	4,214	0.7
51	Gothic loam, 1 to 6 percent slopes	544	0	0	544	0.1
52	Gothic loam, 6 to 25 percent slopes	1,295	0	1,309	2,604	0.4
53	Gothic loam, 25 to 65 percent slopes	3,321	0	5,118	8,439	1.3
54	Grotte gravelly loam, 25 to 65 percent slopes	4,187	1,684	544	6,415	1.0
55	Gypsum land-Gypsiorthids complex, 12 to 65 percent slopes	27,833	2,965	143	30,941	4.8

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Eagle County	Garfield County	Pitkin County	Total-- Area	Extent
		Acres	Acres	Acres	Acres	Pct
56	Ipson cobbly loam, 3 to 25 percent slopes	740	402	1,020	2,162	0.3
57	Ipson cobbly loam, 25 to 50 percent slopes	233	531	2,230	2,994	0.5
58	Irrawaddy very stony loam, 25 to 65 percent slopes	337	1,855	0	2,192	0.3
59	Iyers loam, 6 to 25 percent slopes	2,419	689	0	3,108	0.5
60	Iyers loam, 25 to 65 percent slopes	1,656	0	0	1,656	0.3
61	Iyers silty clay loam, 6 to 25 percent slopes	1,410	0	0	1,410	0.2
62	Iyers silty clay loam, 25 to 65 percent slopes	968	0	0	968	0.2
63	Jerry loam, 12 to 25 percent slopes	949	595	944	2,488	0.4
64	Jerry loam, 25 to 65 percent slopes	5,703	3,996	9,036	18,735	2.9
65	Jerry-Millerlake loams, 1 to 6 percent slopes	2,294	244	698	3,236	0.5
66	Jerry-Millerlake loams, 6 to 25 percent slopes	6,676	2,189	3,112	11,977	1.9
67	Jerry-Millerlake loams, 25 to 45 percent slopes	10,895	3,264	1,963	16,122	2.5
68	Jodero loam, 1 to 12 percent slopes	277	234	306	817	0.1
69	Kilgore silt loam	1,415	693	989	3,097	0.5
70	Kobar silty clay loam, 1 to 6 percent slopes	226	188	588	1,002	0.2
71	Kobar silty clay loam, 6 to 12 percent slopes	1,014	436	2,480	3,930	0.6
72	Kobar silty clay loam, 12 to 25 percent slopes	591	49	1,278	1,918	0.3
73	Kobar silty clay loam, dry, 3 to 25 percent slopes	911	0	0	911	0.1
74	Leavittville loam, 4 to 25 percent slopes	156	1,739	0	1,895	0.3
75	Millerlake loam, 15 to 30 percent slopes	2,186	1,650	0	3,836	0.6
76	Mine loam, 12 to 25 percent slopes	0	0	309	309	*
77	Mine loam, 25 to 65 percent slopes	90	0	1,321	1,411	0.2
78	Miracle loam, 3 to 30 percent slopes	3,394	0	0	3,394	0.5
79	Moen stony loam, 1 to 6 percent slopes	1,293	0	0	1,293	0.2
80	Moen stony loam, 6 to 12 percent slopes	1,944	0	0	1,944	0.3
81	Moen stony loam, 12 to 25 percent slopes	505	0	0	505	0.1
82	Monad fine sandy loam, 12 to 25 percent slopes	1,074	0	0	1,074	0.2
83	Monad fine sandy loam, 25 to 50 percent slopes	843	0	0	843	0.1
84	Morval loam, 1 to 6 percent slopes	350	0	360	710	0.1
85	Morval loam, 6 to 25 percent slopes	351	731	979	2,061	0.3
86	Morval loam, 25 to 40 percent slopes	363	139	924	1,426	0.2
87	Morval-Tridell complex, 12 to 50 percent slopes	997	4,119	0	5,116	0.8
88	Moyerson-Rock outcrop complex, 15 to 60 percent slopes	5,948	0	0	5,948	0.9
89	Mussel loam, 1 to 6 percent slopes	2,299	178	0	2,477	0.4
90	Mussel loam, 6 to 12 percent slopes	1,234	531	28	1,793	0.3
91	Mussel loam, 12 to 25 percent slopes	462	40	0	502	0.1
92	Redrob loam, 1 to 6 percent slopes	1,723	1,727	516	3,966	0.6
93	Rogert very stony sandy loam, 25 to 65 percent slopes	280	0	0	280	*
94	Showalter-Morval complex, 5 to 15 percent slopes	1,049	2,605	550	4,204	0.7
95	Showalter-Morval complex, 15 to 25 percent slopes	5,159	9,254	519	14,932	2.3
96	Southace cobbly sandy loam, 1 to 6 percent slopes	507	98	66	671	0.1
97	Southace cobbly sandy loam, 6 to 12 percent slopes	494	395	357	1,246	0.2
98	Southace cobbly sandy loam, 12 to 25 percent slopes	3,212	341	691	4,244	0.7
99	Southace cobbly sandy loam, 25 to 65 percent slopes	2,719	138	124	2,981	0.5
100	Starley-Starman very channery loams, 3 to 25 percent slopes	1,100	1,351	0	2,451	0.4
101	Tanna-Pinelli complex, 1 to 6 percent slopes	337	0	0	337	0.1
102	Tanna-Pinelli complex, 6 to 12 percent slopes	734	0	0	734	0.1
103	Tanna-Pinelli complex, 12 to 25 percent slopes	3,997	0	0	3,997	0.6
104	Torriorthents-Camborthids-Rock outcrop complex, 6 to 65 percent slopes	42,796	4,174	4,704	51,674	7.6
105	Torriorthents-Rock outcrop complex, 45 to 95 percent slopes	12,128	0	1,450	13,578	2.1
106	Tridell-Brownsto stony sandy loams, 12 to 50 percent slopes, extremely stony	15,388	8,770	749	24,907	3.9
107	Uracca, moist-Mergel complex, 1 to 6 percent slopes, extremely stony	773	65	1,705	2,543	0.4
108	Uracca, moist-Mergel complex, 6 to 12 percent slopes, extremely stony	295	195	1,045	1,535	0.2
109	Uracca, moist-Mergel complex, 12 to 25 percent slopes, extremely stony	543	146	711	1,400	0.2
110	Uracca, moist-Mergel complex, 25 to 65 percent slopes, extremely stony	1,280	16	2,540	3,836	0.6

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Eagle County	Garfield County	Pitkin County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Acres	Pct
111	Vandamore channery sandy loam, 25 to 65 percent slopes	7,649	0	0	7,649	1.2
112	Woodhall gravelly loam, 6 to 50 percent slopes, extremely stony	2,195	0	0	2,195	0.3
113	Woosley loam, 3 to 30 percent slopes	400	0	0	400	0.1
114	Yamo loam, 1 to 6 percent slopes	3,036	33	0	3,069	0.5
115	Yamo loam, 6 to 12 percent slopes	5,021	496	0	5,517	0.9
116	Yamo loam, 12 to 25 percent slopes	1,327	207	26	1,560	0.2
117	Yeljack-Callings complex, 12 to 25 percent slopes	188	50	852	1,090	0.2
118	Youga loam, 12 to 30 percent slopes	544	0	0	544	0.1
119	Zillman very flaggy loam, 25 to 65 percent slopes	3,813	511	0	4,324	0.7
	Water	3,083	591	611	4,285	0.7
	Total	419,840	117,120	106,240	643,200	100.0

* Less than 0.1 percent.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS

(Yields in the N columns are for nonirrigated soils; those in the I columns are for irrigated soils. Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability		Alfalfa hay		Grass hay		Barley	
	N	I	N	I	N	I	N	I
			Tons	Tons	Tons	Tons	Bu	Bu
1------------------------ Acree	IVe	IVe	---	5.0	---	4.0	30	80
2------------------------ Acree	VIe	---	---	---	---	---	---	---
3------------------------ Acree	IVe	IVe	---	5.0	---	4.0	30	90
4------------------------ Acree	IVe	IVe	---	5.0	---	4.0	30	80
5------------------------ Acree	VIe	---	---	---	---	---	---	---
6------------------------ Almy	IVe	IVe	---	6.0	---	5.0	---	---
7------------------------ Almy	VIe	---	---	---	---	---	---	---
8------------------------ Ansel-Anvik	VIe	---	---	---	---	---	---	---
9------------------------ Ansel-Anvik	VIIe	---	---	---	---	---	---	---
10----------------------- Anvik-Skylick-Sligting	VIe	---	---	---	---	---	---	---
11----------------------- Anvik-Skylick-Sligting	VIIe	---	---	---	---	---	---	---
12*---------------------- Arle-Ansari-Rock outcrop	VIIe	---	---	---	---	---	---	---
13----------------------- Atencio-Azeltine	VIe	IVe	---	5.0	---	4.0	---	70
14----------------------- Callings-Yeljack	VIIe	---	---	---	---	---	---	---
15----------------------- Charcol-Mord	VIIe	---	---	---	---	---	---	---
16----------------------- Charcol-Mord	VIIe	---	---	---	---	---	---	---
17, 18------------------- Cochetopa-Antrobus	VIe	---	---	---	---	---	---	---
19----------------------- Cochetopa-Antrobus	VIIe	---	---	---	---	---	---	---
20----------------------- Coulterg	VIIe	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability		Alfalfa hay		Grass hay		Barley	
	N	I	N	I	N	I	N	I
			Tons	Tons	Tons	Tons	Bu	Bu
21 Curecanti-Fughes	VIe	VIe	---	4.0	3.5	---	---	---
22 Curecanti-Fughes	VIIe	---	---	---	---	---	---	---
23 Cushool	VIe	---	---	---	---	---	---	---
24 Cushool	VIIe	---	---	---	---	---	---	---
25 Cushool-Rentsac	VIIe	---	---	---	---	---	---	---
26 Dahlquist-Southace	VIe	VIe	---	---	---	---	---	---
27 Dahlquist-Southace	VIe	---	---	---	---	---	---	---
28 Dahlquist-Southace	VIIe	---	---	---	---	---	---	---
29* Dollard-Rock outcrop	VIe	---	---	---	---	---	---	---
30* Dollard-Rock outcrop	VIIe	---	---	---	---	---	---	---
31 Dotsero	VIe	---	---	---	---	---	---	---
32 Dotsero	IVe	IVe	---	4.5	---	4.0	---	80
33* Earsman-Rock outcrop	VIIe	---	---	---	---	---	---	---
34 Empedrado	IVe	IVe	---	6.0	---	5.0	---	90
35 Empedrado	IVe	IVe	---	5.0	---	4.0	---	75
36 Empedrado	VIe	VIe	---	4.0	---	3.5	---	---
37 Etoe	VIIe	---	---	---	---	---	---	---
38 Evanston	IVe	IVe	---	6.0	---	5.0	---	90
39 Evanston	VIe	---	---	---	---	---	---	---
40, 41 Evanston	VIIe	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability		Alfalfa hay		Grass hay		Barley	
	N	I	N	I	N	I	N	I
			Tons	Tons	Tons	Tons	Bu	Bu
42------------------------ Fluvaquents	VIw	---	---	---	---	---	---	---
43------------------------ Forelle-Brownsto	IVe	---	---	---	---	---	---	---
44------------------------ Forelle-Brownsto	VIe	---	---	---	---	---	---	---
45------------------------ Forsey	VIe	VIe	---	---	---	---	---	---
46------------------------ Forsey	VIe	---	---	---	---	---	---	---
47------------------------ Forsey	VIIe	---	---	---	---	---	---	---
48------------------------ Fughes	IVe	IVe	---	5.0	---	4.0	---	75
49------------------------ Goslin	IVe	IVe	---	4.0	---	3.5	---	---
50------------------------ Goslin	VIe	VIe	---	4.0	---	3.0	---	---
51------------------------ Gothic	VIe	VIe	4.0	---	---	3.5	---	---
52------------------------ Gothic	VIe	VIe	4.0	---	---	3.5	---	---
53------------------------ Gothic	VIIe	---	---	---	---	---	---	---
54------------------------ Grotte	VIIe	---	---	---	---	---	---	---
55------------------------ Gypsum land-Gypsiorthids	VIII	---	---	---	---	---	---	---
56------------------------ Ipson	VIe	---	---	---	---	---	---	---
57------------------------ Ipson	VIIe	---	---	---	---	---	---	---
58------------------------ Irrawaddy	VIIe	---	---	---	---	---	---	---
59------------------------ Iyers	VIe	---	---	---	---	---	---	---
60------------------------ Iyers	VIIe	---	---	---	---	---	---	---
61------------------------ Iyers	VIe	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability		Alfalfa hay		Grass hay		Barley	
	N	I	N	I	N	I	N	I
			Tons	Tons	Tons	Tons	Bu	Bu
62------------------------ Iyers	VIIe	---	---	---	---	---	---	---
63------------------------ Jerry	VIe	---	---	---	---	---	---	---
64------------------------ Jerry	VIIe	---	---	---	---	---	---	---
65------------------------ Jerry-Millerlake	VIe	VIe	---	3.2	---	4.0	---	---
66------------------------ Jerry-Millerlake	VIe	VIe	---	3.0	---	4.0	---	---
67------------------------ Jerry-Millerlake	VIIe	---	---	---	---	---	---	---
68------------------------ Jodero	IVe	IVe	---	3.0	---	2.0	---	---
69------------------------ Kilgore	Vw	Vw	---	4.0	1.5	3.5	---	---
70, 71-------------------- Kobar	IVe	IVe	---	4.0	---	3.0	---	---
72------------------------ Kobar	VIe	---	---	---	---	---	---	---
73------------------------ Kobar	VIe	IVe	---	4.0	---	3.0	---	---
74------------------------ Leavittville	VIe	---	---	---	---	---	---	---
75------------------------ Millerlake	VIe	VIe	---	3.0	---	4.0	---	---
76------------------------ Mine	VIe	---	---	---	---	---	---	---
77------------------------ Mine	VIIe	---	---	---	---	---	---	---
78------------------------ Miracle	VIe	---	---	---	---	---	---	---
79------------------------ Moen	VIe	VIe	---	4.0	---	3.0	---	---
80------------------------ Moen	VIe	VIe	---	3.0	---	2.5	---	---
81------------------------ Moen	VIe	---	---	---	---	---	---	---
82------------------------ Monad	VIe	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability		Alfalfa hay		Grass hay		Barley	
	N	I	N	I	N	I	N	I
			Tons	Tons	Tons	Tons	Bu	Bu
83------------------------ Monad	VIIe	---	---	---	---	---	---	---
84------------------------ Morval	IVe	IVe	---	4.0	---	3.0	---	60
85------------------------ Morval	VIe	---	---	---	---	---	---	---
86------------------------ Morval	VIIe	---	---	---	---	---	---	---
87------------------------ Morval-Tridell	VIIe	---	---	---	---	---	---	---
88*----------------------- Moyerson-Rock outcrop	VIIe	---	---	---	---	---	---	---
89------------------------ Mussel	IVe	IVe	---	5.0	---	4.0	35	100
90------------------------ Mussel	IVe	IVe	---	5.0	---	4.0	---	---
91------------------------ Mussel	VIe	---	---	---	---	---	---	---
92------------------------ Redrob	IVw	IVw	---	---	---	4.0	---	---
93------------------------ Rogert	VIIe	---	---	---	---	---	---	---
94------------------------ Showalter-Morval	VIe	VIe	4.0	4.0	---	3.0	---	60
95------------------------ Showalter-Morval	VIe	---	---	---	---	---	---	---
96, 97, 98---------------- Southace	VIe	---	---	---	---	---	---	---
99------------------------ Southace	VIIe	---	---	---	---	---	---	---
100----------------------- Starley-Starman	VIIe	---	---	---	---	---	---	---
101----------------------- Tanna-Pinelli	IVe	---	---	---	---	---	---	---
102----------------------- Tanna-Pinelli	IVe	---	---	---	---	---	---	---
103----------------------- Tanna-Pinelli	VIe	---	---	---	---	---	---	---
104*---------------------- Torriorthents-Camborthids-Rock outcrop	VIIe	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability		Alfalfa hay		Grass hay		Barley	
	N	I	N	I	N	I	N	I
			Tons	Tons	Tons	Tons	Bu	Bu
105*: Torriorthents-Rock outcrop	VIII	---	---	---	---	---	---	---
106: Tridell-Brownsto	VIIe	---	---	---	---	---	---	---
107: Uracca-Mergel	VIs	VIs	---	5.0	---	4.0	---	---
108: Uracca-Mergel	VIe	VIe	---	---	---	3.5	---	---
109: Uracca-Mergel	VIe	---	---	---	---	---	---	---
110: Uracca-Mergel	VIIe	---	---	---	---	---	---	---
111: Vandamore	VIIe	---	---	---	---	---	---	---
112: Woodhall	VIIe	---	---	---	---	---	---	---
113: Woosley	VIe	---	---	---	---	---	---	---
114, 115: Yamo	IVe	IVe	5.0	---	---	4.0	---	---
116: Yamo	VIe	---	---	---	---	---	---	---
117: Yeljack-Callings	VIe	---	---	---	---	---	---	---
118: Youga	VIe	---	---	---	---	---	---	---
119: Zillman	VIIe	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

(Only the soils that support rangeland or woodland understory vegetation suitable for grazing are listed)

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1, 2 Acree	Loamy Slopes #303	Favorable	1,200	True mountainmahogany	15
		Normal	900	Antelope bitterbrush	15
		Unfavorable	500	Western wheatgrass	10
				Prairie junegrass	10
				Saskatoon serviceberry	10
				Bluebunch wheatgrass	10
				Indian ricegrass	10
				Mountain big sage	10
3, 4, 5 Acree	Mountain Loam #228	Favorable	1,800	Slender wheatgrass	10
		Normal	1,500	Nodding bromegrass	10
		Unfavorable	1,000	Western wheatgrass	10
				Letterman needlegrass	10
				Mountain big sage	10
				Idaho fescue	10
				Saskatoon serviceberry	5
6, 7 Almy	Rolling Loam #298	Favorable	1,100	Bluebunch wheatgrass	15
		Normal	950	Needleandthread	10
		Unfavorable	650	Sandberg bluegrass	10
				Wyoming big sagebrush	10
				Bottlebrush squirreltail	5
				Indian ricegrass	5
8*, 9*:					
Ansel	Spruce-Fir	Favorable	300	Sedge	15
		Normal	250	Slender wheatgrass	15
		Unfavorable	175	Boxleaf myrtle	10
				Dwarf blueberry	10
				Heartleaf arnica	10
Anvik	Spruce-Fir	Favorable	300	Elk sedge	15
		Normal	250	Slender wheatgrass	15
		Unfavorable	175	Boxleaf myrtle	10
				Dwarf blueberry	10
				Heartleaf arnica	10
				Nodding bromegrass	5
10*, 11*:					
Anvik	Aspen	Favorable	3,500	Thurber fescue	10
		Normal	3,000	Parry oatgrass	10
		Unfavorable	2,000	Idaho fescue	10
				Nodding bromegrass	5
				Muttongrass	5
				Bearded wheatgrass	5
Skylick	Aspen	Favorable	3,500	Thurber fescue	10
		Normal	3,000	Parry oatgrass	10
		Unfavorable	2,000	Idaho fescue	10
				Bearded wheatgrass	5
				Nodding bromegrass	5
				Muttongrass	5
				Mountain snowberry	5
Sligting	Aspen	Favorable	2,000	Arizona fescue	30
		Normal	1,500	Nodding bromegrass	20
		Unfavorable	1,000	Bearded wheatgrass	10
				Snowberry	10

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo- sition
			Lb/acre		Pct
12*:					
Arle	Loamy Slopes #303	Favorable	1,200	Western wheatgrass	20
		Normal	900	Indian ricegrass	15
		Unfavorable	500	Bluebunch wheatgrass	15
				Gambel oak	10
				Needleandthread	8
				Utah serviceberry	7
				True mountainmahogany	7
				Mountain big sage	5
Ansari	Loamy Slopes #303	Favorable	850	Indian ricegrass	20
		Normal	700	Western wheatgrass	15
		Unfavorable	500	Pinyon	5
				Juniper	5
				Mountain big sage	5
				Utah serviceberry	5
				Needleandthread	5
Rock outcrop.					
13*:					
Atencio	Rolling Loam #298	Favorable	1,000	Western wheatgrass	20
		Normal	800	Needleandthread	15
		Unfavorable	500	Wyoming big sagebrush	15
				Indian ricegrass	10
				Prairie junegrass	5
				Bottlebrush squirreltail	5
				Rabbitbrush	5
Azeltine	Rolling Loam #298	Favorable	1,000	Western wheatgrass	20
		Normal	800	Needleandthread	15
		Unfavorable	600	Wyoming big sagebrush	15
				Indian ricegrass	10
				Prairie junegrass	5
				Bottlebrush squirreltail	5
				Rabbitbrush	5
14*:					
Callings	Brushy Loam #238	Favorable	3,000	Gambel oak	15
		Normal	2,000	Mountain brome	10
		Unfavorable	1,500	Letterman needlegrass	10
				Elk sedge	10
				Mountain snowberry	5
				Slender wheatgrass	5
				Western wheatgrass	5
				Saskatoon serviceberry	5
				Big bluegrass	5
Yeljack	Mountain Loam #228	Favorable	1,800	Arizona fescue	15
		Normal	1,500	Letterman needlegrass	10
		Unfavorable	1,200	Mountain brome	10
				Slender wheatgrass	10
				Mountain big sage	10
15*, 16*:					
Charcol	Lodgepole Pine	Favorable	300	Bluegrass	15
		Normal	200	Brome	15
		Unfavorable	150	Sedge	10
				Oregongrape	10
				Creeping juniper	10

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
15*, 16*:					
Mord	Lodgepole Pine	Favorable	300	Columbia needlegrass	10
		Normal	200	Elk sedge	10
		Unfavorable	150	Oregongrape	10
				Common juniper	10
				Bluegrass	10
				Brome	10
17*, 18*, 19*:					
Cochetopa	Subalpine Loam #250	Favorable	3,500	Thurber fescue	40
		Normal	2,800	Parry oatgrass	10
		Unfavorable	2,000	Nodding bromegrass	10
				Bearded wheatgrass	10
				Columbia needlegrass	5
				Silver sagebrush	5
Antrobus	Stony Loam #237	Favorable	2,000	Saskatoon serviceberry	10
		Normal	1,200	Wheatgrass	10
		Unfavorable	1,000	True mountainmahogany	8
				Bluegrass	7
				Gambel oak	5
				Indian ricegrass	5
				Prairie junegrass	5
				Elk sedge	5
				Antelope bitterbrush	5
20 Coulterg	Douglas Fir	Favorable	300	Mountain snowberry	20
		Normal	275	Bluegrass	10
		Unfavorable	250	Oregongrape	10
				Sedge	10
				Dwarf blueberry	10
				Slender wheatgrass	5
				Elk sedge	5
				Rocky Mountain juniper	5
				Gambel oak	5
				Common juniper	5
21*, 22*:					
Curecanti	Stony Loam #237	Favorable	2,000	Bluebunch wheatgrass	20
		Normal	1,200	Letterman needlegrass	10
		Unfavorable	1,000	Mountain big sage	10
				Muttongrass	5
				Western wheatgrass	5
				Antelope bitterbrush	5
				Saskatoon serviceberry	5
				Mountain snowberry	5
Fughes	Mountain Loam #228	Favorable	1,800	Idaho fescue	15
		Normal	1,500	Big bluegrass	15
		Unfavorable	1,200	Columbia needlegrass	10
				Mountain big sage	10
				Western wheatgrass	5
				Slender wheatgrass	5
				Letterman needlegrass	5
				Mountain snowberry	5
				Saskatoon serviceberry	5

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
23, 24: Cushool	Stony Foothills #287	Favorable	800	Bluebunch wheatgrass	20
		Normal	600	Indian ricegrass	15
		Unfavorable	400	Needleandthread	15
				Utah serviceberry	10
				Western wheatgrass	10
				Utah juniper	10
				Wyoming big sagebrush	5
25*:					
Cushool	Pinyon-Juniper	Favorable	800	Bluebunch wheatgrass	20
		Normal	600	Indian ricegrass	15
		Unfavorable	400	Needleandthread	15
				Utah serviceberry	10
				Western wheatgrass	10
				Utah juniper	10
				Wyoming big sagebrush	5
Rentsac	Pinyon-Juniper	Favorable	250	Galleta	30
		Normal	150	Bluebunch wheatgrass	15
		Unfavorable	100	Indian ricegrass	10
				Needleandthread	5
				Big sagebrush	5
26*, 27*, 28*:					
Dahlquist	Loamy Slopes #303	Favorable	1,200	Prairie junegrass	20
		Normal	900	Basin big sagebrush	10
		Unfavorable	500	Western wheatgrass	10
				Antelope bitterbrush	5
				Black sagebrush	5
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
				Indian ricegrass	5
Southace	Stony Foothills #287	Favorable	800	Western wheatgrass	15
		Normal	600	Bluebunch wheatgrass	10
		Unfavorable	400	Basin big sagebrush	10
				Galleta	10
				Utah juniper	10
				Indian ricegrass	5
				Utah serviceberry	5
				Bottlebrush squirreltail	5
				Fringed sagebrush	5
29*, 30*:					
Dollard	Mountain Shale #244	Favorable	1,000	Western wheatgrass	30
		Normal	400	Muttongrass	10
		Unfavorable	300	Basin big sagebrush	10
				Utah serviceberry	10
				Prairie junegrass	5
				True mountainmahogany	5
				Mountain big sage	5
Rock outcrop.					
31, 32: Dotsero	Deep Loam #292	Favorable	1,800	Needleandthread	20
		Normal	1,500	Bluebunch wheatgrass	15
		Unfavorable	900	Basin big sagebrush	15
				Western wheatgrass	10
				Prairie junegrass	10

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo- sition
			Lb/acre		Pct
33*:					
Earsman	Pinyon-Juniper	Favorable	600	Gambel oak	15
		Normal	500	Muttongrass	10
		Unfavorable	400	Needleandthread	10
				Saskatoon serviceberry	10
				Western wheatgrass	10
				Bluebunch wheatgrass	5
				Bottlebrush squirreltail	5
				Indian ricegrass	5
				Prairie junegrass	5
				True mountainmahogany	5
Rock outcrop.					
34, 35, 36 Empedrado	Deep Loam #292	Favorable	1,800	Western wheatgrass	25
		Normal	1,500	Needleandthread	15
		Unfavorable	1,000	Mountain big sage	10
				Gambel oak	5
				Rubber rabbitbrush	5
37 Etoe	Douglas Fir	Favorable	400	Columbia needlegrass	15
		Normal	250	Grouse whortleberry	15
		Unfavorable	150	Mountain snowberry	10
				Nodding bromegrass	5
				Kinnikinnick	5
				Common juniper	5
				Boxleaf myrtle	5
38, 39, 40, 41 Evanston	Deep Loam #292	Favorable	1,800	Basin big sagebrush	10
		Normal	1,500	Needleandthread	10
		Unfavorable	900	Western wheatgrass	10
				Prairie junegrass	5
				Muttongrass	5
				Saskatoon serviceberry	5
				Mountain snowberry	5
42* Fluvaquents	Riverbottom	Favorable	3,000	Alkali sacaton	40
		Normal	2,500	Sedge	15
		Unfavorable	1,000	Western wheatgrass	15
				Inland saltgrass	10
43*, 44*:					
Forelle	Rolling Loam #298	Favorable	1,200	Western wheatgrass	40
		Normal	800	Bluebunch wheatgrass	20
		Unfavorable	600	Indian ricegrass	5
				Douglas rabbitbrush	5
Brownsto	Stony Foothills #287	Favorable	800	Wyoming big sagebrush	10
		Normal	600	Bluebunch wheatgrass	10
		Unfavorable	400	Western wheatgrass	10
				Bottlebrush squirreltail	5
				Needleandthread	5
				Indian ricegrass	5
				Pinyon	5
				Utah juniper	5
45, 46, 47 Forsey	Stony Loam #237	Favorable	2,000	Bluebunch wheatgrass	20
		Normal	1,200	Saskatoon serviceberry	15
		Unfavorable	1,000	Muttongrass	10
				Arizona fescue	5
				Needleandthread	5
				Basin big sagebrush	5
				Prairie junegrass	5

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
48: Fughes	Mountain Loam #228	Favorable	1,800	Idaho fescue	15
		Normal	1,500	Big bluegrass	15
		Unfavorable	1,200	Columbia needlegrass	10
				Mountain big sage	10
				Western wheatgrass	5
				Slender wheatgrass	5
				Letterman needlegrass	5
				Mountain snowberry	5
				Saskatoon serviceberry	5
49, 50: Goslin	Rolling Loam #298	Favorable	1,000	Western wheatgrass	20
		Normal	800	Bluegrass	20
		Unfavorable	500	Wyoming big sagebrush	10
				Bluebunch wheatgrass	5
				Bottlebrush squirreltail	5
				Indian ricegrass	5
				Needleandthread	5
				Winterfat	5
51, 52, 53: Gothic	Brushy Loam #238	Favorable	3,000	Gambel oak	15
		Normal	2,000	Mountain brome	10
		Unfavorable	1,500	Big bluegrass	5
				Slender wheatgrass	5
				Western wheatgrass	5
				Saskatoon serviceberry	5
54: Grotte	Stony Foothills #287	Favorable	800	Bluebunch wheatgrass	15
		Normal	600	Prairie junegrass	10
		Unfavorable	400	Wyoming big sagebrush	10
				True mountainmahogany	10
				Bottlebrush squirreltail	5
				Indian ricegrass	5
				Utah juniper	5
				Needleandthread	5
				Utah serviceberry	5
56, 57: Ipson	Loamy Slopes #303	Favorable	1,200	Indian ricegrass	10
		Normal	900	Antelope bitterbrush	10
		Unfavorable	500	Mountain big sage	10
				Bluebunch wheatgrass	10
				Western wheatgrass	10
				Muttongrass	10
				True mountainmahogany	10
58: Irrawaddy	Brushy Loam #238	Favorable	3,000	Gambel oak	15
		Normal	2,000	Elk sedge	10
		Unfavorable	1,500	Columbia needlegrass	10
				Mountain brome	10
				Big bluegrass	10
				Mountain snowberry	5
				Slender wheatgrass	5
				Saskatoon serviceberry	5
59, 60, 61, 62: Iyers	Subalpine Loam #250	Favorable	3,300	Thurber fescue	40
		Normal	2,500	Idaho fescue	10
		Unfavorable	1,800	Needlegrass	10
				Slender wheatgrass	5
				Nodding bromegrass	5
				Silver sagebrush	5

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
63, 64 Jerry	Brushy Loam #238	Favorable	3,000	Gambel oak	25
		Normal	2,000	Elk sedge	15
		Unfavorable	1,500	Mountain snowberry	10
				Mountain brome	10
				Saskatoon serviceberry	10
				Letterman needlegrass	10
65*, 66*, 67*:					
Jerry	Brushy Loam #238	Favorable	3,000	Gambel oak	25
		Normal	2,000	Elk sedge	15
		Unfavorable	1,500	Mountain snowberry	10
				Mountain brome	10
				Saskatoon serviceberry	10
				Letterman needlegrass	10
Millerlake	Stony Loam #237	Favorable	2,000	Bluebunch wheatgrass	15
		Normal	1,200	Saskatoon serviceberry	15
		Unfavorable	1,000	Mountain big sage	10
				Idaho fescue	10
				Needlegrass	10
				Indian ricegrass	5
				Antelope bitterbrush	5
68 Jodero	Mountain Swale #245	Favorable	3,000	Basin wildrye	20
		Normal	2,500	Western wheatgrass	15
		Unfavorable	2,000	Basin big sagebrush	15
				Mountain brome	10
69 Kilgore	Mountain Meadow #241	Favorable	4,000	Tufted hairgrass	35
		Normal	3,000	Sedge	30
		Unfavorable	2,000	Cinquefoil	10
				Willow	10
				Basin wildrye	5
				Iris	5
				Rush	5
70, 71, 72 Kobar	Deep Clay Loam #247	Favorable	2,100	Western wheatgrass	30
		Normal	1,600	Letterman needlegrass	10
		Unfavorable	1,400	Wyoming big sagebrush	10
				Muttongrass	5
				Nodding bromegrass	5
				Saskatoon serviceberry	5
				Mulesear wyethia	5
73 Kobar	Clayey Foothills #289	Favorable	1,200	Western wheatgrass	35
		Normal	900	Mountain big sage	20
		Unfavorable	600	Bottlebrush squirreltail	10
				Muttongrass	5
				Indian ricegrass	5
				Small Douglas rabbitbrush	5
74 Leavittville	Subalpine Loam #250	Favorable	3,000	Thurber fescue	30
		Normal	2,800	Parry oatgrass	20
		Unfavorable	2,000	Idaho fescue	10
				Big bluegrass	10
				Western wheatgrass	5
				Columbia needlegrass	5

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
75 Millerlake	Deep Loam #292	Favorable	1,800	Mountain big sage	10
		Normal	1,300	Western wheatgrass	10
		Unfavorable	900	Prairie junegrass	10
				Mountain snowberry	5
				Bluebunch wheatgrass	5
76, 77 Mine	Spruce-Fir or Successional Aspen.	Favorable	250	Boxleaf myrtle	20
		Normal	250	Elk sedge	15
		Unfavorable	200	Common juniper	15
				Muttongrass	10
				Spike trisetum	10
				Russet buffaloberry	10
				Willow	5
78 Miracle	Mountain Loam #228	Favorable	1,800	Arizona fescue	15
		Normal	1,500	Western wheatgrass	15
		Unfavorable	1,200	Mountain big sage	10
				Letterman needlegrass	5
				Mountain snowberry	5
79, 80, 81 Moen	Stony Foothills #287	Favorable	800	Bluebunch wheatgrass	10
		Normal	600	Wyoming big sagebrush	10
		Unfavorable	400	Utah juniper	10
				Indian ricegrass	10
				Needleandthread	5
				Muttongrass	5
				Black sagebrush	5
				Bottlebrush squirreltail	5
82, 83 Monad	Mountain Loam #228	Favorable	1,800	Bluebunch wheatgrass	10
		Normal	1,500	Prairie junegrass	10
		Unfavorable	1,200	Big bluegrass	10
				Slender wheatgrass	10
				Basin big sagebrush	10
				Mountain snowberry	5
84, 85, 86 Morval	Deep Loam #292	Favorable	1,800	Needleandthread	15
		Normal	1,500	Western wheatgrass	10
		Unfavorable	900	Mountain snowberry	10
				Muttongrass	5
				Prairie junegrass	5
				Mountain big sage	5
87*:					
Morval	Deep Loam #292	Favorable	1,800	Needleandthread	15
		Normal	1,500	Western wheatgrass	10
		Unfavorable	900	Mountain snowberry	10
				Muttongrass	5
				Prairie junegrass	5
				Mountain big sage	5
Tridell	Pinyon-Juniper	Favorable	400	Bluebunch wheatgrass	10
		Normal	300	Indian ricegrass	10
		Unfavorable	200	Needleandthread	10
				Nevada bluegrass	5
				Galleta	5
				Wyoming big sagebrush	5
				Black sagebrush	5
				Antelope bitterbrush	5

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
88*:					
Moyerson	Pinyon-Juniper	Favorable	300	Indian ricegrass	15
		Normal	200	Western wheatgrass	15
		Unfavorable	100	Bottlebrush squirreltail	10
				Utah serviceberry	10
				True mountainmahogany	10
Rock outcrop.					
89, 90, 91 Mussel	Rolling Loam #298	Favorable	1,000	Western wheatgrass	20
		Normal	800	Needleandthread	10
		Unfavorable	500	Bluegrass	10
				Basin big sagebrush	10
				Indian ricegrass	5
92 Redrob	Riverbottom	Favorable	3,000	Narrowleaf cottonwood	20
		Normal	2,000	Sedge	20
		Unfavorable	1,000	Slender wheatgrass	15
				Redtop	15
				Rush	15
				Willow	10
				Rose	5
93 Rogert	Rocky Loam #229	Favorable	1,400	Western wheatgrass	20
		Normal	1,000	Bluebunch wheatgrass	5
		Unfavorable	700	Needleandthread	5
				Prairie junegrass	5
				Antelope bitterbrush	5
94*, 95*:					
Showalter	Loamy Slopes #303	Favorable	1,200	Needleandthread	20
		Normal	900	Antelope bitterbrush	15
		Unfavorable	500	True mountainmahogany	15
				Indian ricegrass	10
				Mountain big sage	10
				Bluebunch wheatgrass	10
				Prairie junegrass	10
				Saskatoon serviceberry	10
Morval	Deep Loam #292	Favorable	1,800	Needleandthread	15
		Normal	1,500	Western wheatgrass	10
		Unfavorable	900	Mountain snowberry	10
				Muttongrass	5
				Prairie junegrass	5
				Mountain big sage	5
96, 97, 98, 99 Southace	Loamy Slopes #303	Favorable	1,200	Basin big sagebrush	10
		Normal	900	Bluebunch wheatgrass	10
		Unfavorable	500	Prairie junegrass	10
				Serviceberry	10
				Western wheatgrass	10
				Indian ricegrass	10
				Snowberry	5
100*:					
Starley	Loamy Slopes #303	Favorable	1,200	Mountain big sage	10
		Normal	900	Bluebunch wheatgrass	10
		Unfavorable	500	Indian ricegrass	10
				True mountainmahogany	10
				Western wheatgrass	10
				Prairie junegrass	10
				Saskatoon serviceberry	10

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
100*:					
Starman	Dry Exposure #235	Favorable	500	Bluebunch wheatgrass	20
		Normal	400	Needleandthread	15
		Unfavorable	300	Indian ricegrass	15
				Winterfat	10
				Fringed sagebrush	10
101*, 102*, 103*:					
Tanna	Clayey Foothills #289	Favorable	1,200	Western wheatgrass	40
		Normal	900	Mountain big sagebrush	20
		Unfavorable	600	Indian ricegrass	5
				Bottlebrush squirreltail	5
Pinelli	Clayey Foothills #289	Favorable	1,200	Western wheatgrass	40
		Normal	900	Mountain big sagebrush	20
		Unfavorable	600	Indian ricegrass	5
				Bottlebrush squirreltail	5
106*:					
Tridell	Pinyon-Juniper	Favorable	400	Bluebunch wheatgrass	10
		Normal	300	Indian ricegrass	10
		Unfavorable	200	Needleandthread	10
				Nevada bluegrass	5
				Muttongrass	5
				Wyoming big sagebrush	5
				Black sagebrush	5
				Antelope bitterbrush	5
Brownsto	Stony Foothills #287	Favorable	800	Western wheatgrass	20
		Normal	600	Needleandthread	10
		Unfavorable	400	Wyoming big sagebrush	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
				Utah juniper	5
107*, 108*, 109*, 110*:					
Uracca	Stony Loam #237	Favorable	2,000	Bluebunch wheatgrass	20
		Normal	1,200	Saskatoon serviceberry	15
		Unfavorable	1,000	Mountain big sage	10
				Indian ricegrass	5
				Needlegrass	5
				Antelope bitterbrush	5
Mergel	Stony Loam #237	Favorable	2,000	Bluebunch wheatgrass	20
		Normal	1,200	Saskatoon serviceberry	15
		Unfavorable	1,000	Mountain big sage	10
				Muttongrass	10
				Indian ricegrass	5
				Needlegrass	5
				Antelope bitterbrush	5
111 Vandamore	Loamy Slopes #303	Favorable	1,200	True mountainmahogany	15
		Normal	900	Antelope bitterbrush	15
		Unfavorable	500	Beardless wheatgrass	10
				Western wheatgrass	10
				Prairie junegrass	10
				Indian ricegrass	10
				Mountain big sage	10

See footnote at end of table.

TABLE 6.--RANGELAND AND WOODLAND UNDERSTORY PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range or woodland site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
112 Woodhall	Douglas Fir	Favorable	450	Arizona fescue	30
		Normal	400	Mountain muhly	20
		Unfavorable	300	Pine dropseed	10
				True mountainmahogany	10
				Bluegrass	5
				Wax currant	5
113 Woosley	Dry Mountain Loam #231	Favorable	1,000	Columbia needlegrass	25
		Normal	750	Bluebunch wheatgrass	25
		Unfavorable	500	Sheep fescue	20
				Basin big sagebrush	15
				Prairie junegrass	15
114, 115, 116 Yamo	Rolling Loam #298	Favorable	1,000	Western wheatgrass	25
		Normal	800	Needleandthread	15
		Unfavorable	500	Wyoming big sagebrush	15
				Sandberg bluegrass	10
				Indian ricegrass	5
				Douglas rabbitbrush	5
				Bluebunch wheatgrass	5
117*:					
Yeljack	Mountain Loam #228	Favorable	1,800	Arizona fescue	15
		Normal	1,500	Letterman needlegrass	10
		Unfavorable	1,200	Mountain brome	10
				Slender wheatgrass	10
				Mountain big sage	10
Callings	Brushy Loam #238	Favorable	3,000	Gambel oak	15
		Normal	2,000	Mountain brome	10
		Unfavorable	1,500	Letterman needlegrass	10
				Elk sedge	10
				Mountain snowberry	5
				Slender wheatgrass	5
				Western wheatgrass	5
				Saskatoon serviceberry	5
				Big bluegrass	5
118 Youga	Subalpine Loam #250	Favorable	3,400	Idaho fescue	20
		Normal	2,800	Wheatgrass	15
		Unfavorable	2,000	Bluegrass	10
				Sagebrush	10
				Antelope bitterbrush	10
119 Zillman	Loamy Slopes #303	Favorable	1,200	True mountainmahogany	15
		Normal	900	Bluebunch wheatgrass	10
		Unfavorable	500	Western wheatgrass	10
				Indian ricegrass	10
				Wyoming big sagebrush	10
				Utah serviceberry	10
				Prairie junegrass	10

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
8**:									
Ansel----------	3R	Slight	Moderate	Slight	Moderate	Engelmann spruce----	55	3	
						Douglas fir---------	---	---	
						Engelmann spruce----	---	---	
Anvik----------	6R	Moderate	Slight	Slight	Slight	Douglas fir---------	91	6	
9**:									
Ansel----------	3R	Moderate	Moderate	Slight	Moderate	Engelmann spruce----	55	3	
						Douglas fir---------	---	---	
						Engelmann spruce----	---	---	
Anvik----------	5R	Severe	Slight	Slight	Slight	Douglas fir---------	85	5	
10**:									
Anvik----------	2R	Moderate	Moderate	Slight	Moderate	Quaking aspen-------	65	2	
Skylick--------	2R	Moderate	Moderate	Slight	Moderate	Quaking aspen-------	65	2	
Sligting-------	2X	Slight	Slight	Slight	Moderate	Quaking aspen-------	60	2	
11**:									
Anvik----------	2R	Severe	Moderate	Slight	Moderate	Quaking aspen-------	65	2	
Skylick--------	2R	Severe	Severe	Slight	Moderate	Quaking aspen-------	65	2	
Sligting-------	2R	Severe	Moderate	Slight	Moderate	Quaking aspen-------	60	2	
15**:									
Charcol--------	3X	Moderate	Moderate	Slight	Moderate	Lodgepole pine------	60	3	
Mord-----------	3C	Slight	Slight	Slight	Slight	Lodgepole pine------	60	3	
16**:									
Charcol--------	3R	Severe	Moderate	Slight	Moderate	Lodgepole pine------	50	3	
Mord-----------	3R	Moderate	Slight	Slight	Slight	Lodgepole pine------	50	3	
20--------------- Coulterg	3A	Moderate	Moderate	Moderate	Moderate	Douglas fir---------	50	3	
						Lodgepole pine------	45	3	
						Ponderosa pine------	55	3	
						Rocky Mountain juniper -----------	---	---	
25**:									
Cushool--------	---	Severe	Slight	Moderate	Severe	Pinyon--------------	---	---	
						Utah juniper--------	---	---	
Rentsac--------	---	Severe	Severe	Severe	Moderate	Pinyon--------------	---	---	
						Juniper-------------	---	---	
33**:									
Earsman--------	---	Severe	Severe	Severe	Slight	Pinyon--------------	---	---	
						Juniper-------------	---	---	
Rock outcrop.									

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Plant competi-tion	Potential productivity: Common trees	Site index	Produc-tivity class*	Trees to plant
37-------------- Etoe	4A	Slight	Moderate	Slight	Moderate	Douglas fir--------- Ponderosa pine------ White fir-----------	72 --- ---	4 --- ---	Douglas fir, ponderosa pine, white fir.
76, 77---------- Mine	5A	Slight	Moderate	Slight	Slight	Lodgepole pine------ Engelmann spruce---- Subalpine fir------- Quaking aspen-------	76 70 --- ---	5 4 --- ---	Lodgepole pine, Engelmann spruce, subalpine fir.
87**: Morval.									
Tridell---------	---	Severe	Severe	Slight	Severe	Pinyon-------------- Utah juniper--------	--- ---	--- ---	
88**: Moyerson-------	---	Severe	Moderate	Severe	Slight	Pinyon-------------- Utah juniper--------	---	---	
Rock outcrop.									
106**: Tridell---------	---	Severe	Severe	Severe	Slight	Pinyon-------------- Utah juniper--------	--- ---	--- ---	
Brownsto.									
112------------- Woodhall	2F	Slight	Severe	Slight	Slight	Douglas fir--------- Ponderosa pine------	48 ---	2 ---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1 Acree	Moderate: large stones.	Moderate: large stones.	Severe: large stones, slope.	Slight	Moderate: large stones.
2 Acree	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
3 Acree	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Moderate: dusty.	Slight.
4 Acree	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
5 Acree	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
6 Almy	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Moderate: dusty.	Slight.
7 Almy	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
8*:					
Ansel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Anvik	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
9*:					
Ansel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Anvik	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
10*:					
Anvik	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Skylick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Sligting	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: large stones, slope.
11*:					
Anvik	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
11*:					
Skylick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sligting	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope.
12*:					
Arle	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope.
Ansari	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, thin layer.
Rock outcrop.					
13*:					
Atencio	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
Azeltine	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty.
14*:					
Callings	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Yeljack	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
15*:					
Charcol	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: large stones, slope.
Mord	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Slight.
16*:					
Charcol	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope.
Mord	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Slight.
17*:					
Cochetopa	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17*:					
Antrobus	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones.
18*:					
Cochetopa	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Antrobus	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, slope.
19*:					
Cochetopa	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Antrobus	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones, slope.
20 Coulterg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
21*:					
Curecanti	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: large stones, small stones.	Severe: large stones.	Severe: large stones.
Fughes	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
22*:					
Curecanti	Severe: slope.	Severe: slope.	Severe: large stones, small stones.	Severe: large stones.	Severe: large stones, slope.
Fughes	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
23 Cushool	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
24 Cushool	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
25*:					
Cushool	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rentsac	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
26*:					
Dahlquist	Moderate: slope.	Moderate: slope.	Severe: large stones, slope.	Slight	Severe: droughty.
Southace	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.	Severe: large stones, droughty.
27*:					
Dahlquist	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.	Severe: droughty, slope.
Southace	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.	Severe: large stones, droughty, slope.
28*:					
Dahlquist	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: droughty, slope.
Southace	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, droughty, slope.
29*:					
Dollard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Rock outcrop.					
30*:					
Dollard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Rock outcrop.					
31 Dotsero	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
32 Dotsero	Slight	Slight	Severe: slope.	Slight	Moderate: droughty.
33*:					
Earsman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: droughty, slope.
Rock outcrop.					
34 Empedrado	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
35: Empedrado	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
36: Empedrado	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
37: Etoe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
38: Evanston	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Moderate: dusty.	Slight.
39: Evanston	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
40, 41: Evanston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
42*: Fluvaquents	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
43*:					
Forelle	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: large stones, slope.
Brownsto	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty, slope.
44*:					
Forelle	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
Brownsto	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
45: Forsey	Moderate: large stones.	Moderate: large stones.	Severe: large stones, slope, small stones.	Moderate: large stones.	Severe: large stones.
46: Forsey	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: large stones, slope.
47: Forsey	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
48 Fughes	Slight	Slight	Severe: slope.	Slight	Moderate: large stones.
49 Goslin	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
50 Goslin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
51 Gothic	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
52 Gothic	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
53 Gothic	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
54 Grotte	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
55*: Gypsum land.					
Gypsiorthids	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, erodes easily.	Severe: slope, thin layer.
56 Ipson	Moderate: slope, large stones, dusty.	Moderate: slope, large stones, dusty.	Severe: large stones, slope.	Moderate: large stones, dusty.	Moderate: large stones, slope.
57 Ipson	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
58 Irrawaddy	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
59 Iyers	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
60 Iyers	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
61 Iyers	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
62 Iyers	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
63 Jerry	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
64 Jerry	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
65*:					
Jerry	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Millerlake	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
66*:					
Jerry	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Millerlake	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
67*:					
Jerry	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Millerlake	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
68 Jodero	Slight	Slight	Severe: slope.	Slight	Slight.
69 Kilgore	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
70 Kobar	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
71 Kobar	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
72 Kobar	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
73 Kobar	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
74 Leavittville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
75 Millerlake	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
76 Mine	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
77 Mine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
78 Miracle	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
79 Moen	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, thin layer.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
80-------------------- Moen	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
81-------------------- Moen	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
82-------------------- Monad	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
83-------------------- Monad	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
84-------------------- Morval	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Severe: erodes easily.	Slight.
85-------------------- Morval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
86-------------------- Morval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
87*:					
Morval---------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Tridell--------------	Severe: slope.	Severe: slope.	Severe: small stones.	Moderate: large stones.	Severe: slope.
88*:					
Moyerson-------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, thin layer.
Rock outcrop.					
89-------------------- Mussel	Slight----------	Slight----------	Moderate: slope, small stones.	Moderate: dusty.	Slight.
90-------------------- Mussel	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: dusty.	Moderate: slope.
91-------------------- Mussel	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
92-------------------- Redrob	Severe: flooding.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
93-------------------- Rogert	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope.	Severe: slope, small stones.	Severe: small stones, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
94*:					
Showalter	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones.
Morval	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
95*:					
Showalter	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, slope.
Morval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
96 Southace	Moderate: large stones, small stones.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Moderate: large stones.	Severe: droughty.
97 Southace	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: large stones.	Severe: droughty.
98 Southace	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: droughty, slope.
99 Southace	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: droughty, slope.
100*:					
Starley	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: small stones, depth to rock.
Starman	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones.	Severe: small stones, depth to rock.
101*:					
Tanna	Moderate: dusty.	Moderate: dusty.	Moderate: slope, depth to rock, dusty.	Moderate: dusty.	Moderate: depth to rock.
Pinelli	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Moderate: dusty.	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
102*:					
Tanna	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope, depth to rock.
Pinelli	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
103*:					
Tanna	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
Pinelli	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
104*:					
Torriorthents	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Camborthids	Variable	Variable	Variable	Variable	Variable.
Rock outcrop.					
105*:					
Torriorthents	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Rock outcrop.					
106*:					
Tridell	Severe: slope.	Severe: slope.	Severe: small stones.	Moderate: large stones.	Severe: slope.
Brownsto	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: large stones, slope.
107*:					
Uracca	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Moderate: large stones.	Severe: large stones, droughty.
Mergel	Moderate: large stones, dusty.	Moderate: large stones, dusty.	Severe: large stones.	Moderate: large stones, dusty.	Moderate: large stones, droughty.
108*:					
Uracca	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.	Severe: large stones, droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
108*:					
Mergel	Moderate: slope, large stones, dusty.	Moderate: slope, large stones, dusty.	Severe: large stones, slope.	Moderate: large stones, dusty.	Moderate: large stones, droughty, slope.
109*:					
Uracca	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.	Severe: large stones, droughty, slope.
Mergel	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope, dusty.	Severe: slope.
110*:					
Uracca	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, droughty, slope.
Mergel	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
111 Vandamore	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
112 Woodhall	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.
113 Woosley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
114 Yamo	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
115 Yamo	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
116 Yamo	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
117*:					
Yeljack	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Callings	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
118 Youga	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
119 Zillman	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
1, 2, 3, 4, 5: Acree	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
6, 7: Almy	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
8*:											
Ansel	Poor	Very poor.	Fair	Good	Fair	Very poor.	Very poor.	Poor	Good	Very poor.	---
Anvik	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
9*:											
Ansel	Very poor.	Very poor.	Fair	Good	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	---
Anvik	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	---
10*:											
Anvik	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
Skylick	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
Sligting	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	---
11*:											
Anvik	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	---
Skylick	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	---
Sligting	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	---
12*:											
Arle	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Ansari	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Rock outcrop.											
13*:											
Atencio	Fair	Good	Good	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Azeltine	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
14*:											
Callings	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.	Good.
Yeljack	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	---
15*, 16*:											
Charcol	Very poor.	Very poor.	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	---
Mord	Poor	Poor	Good	Good	Fair	Poor	Very poor.	Fair	Good	Very poor.	Fair.
17*, 18*, 19*:											
Cochetopa	Poor	Poor	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Antrobus	Very poor.	Very poor.	Good	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
20 Coulterg	Very poor.	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Poor	Good	Very poor.	Poor.
21*, 22*:											
Curecanti	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Fughes	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
23, 24 Cushool	Poor	Very poor.	Fair	Fair	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
25*:											
Cushool	Poor	Very poor.	Fair	Fair	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
Rentsac	Very poor.	Very poor.	Poor	Fair	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	---
26*, 27*, 28*:											
Dahlquist	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
Southace	Very poor.	Very poor.	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
29*, 30*:											
Dollard	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Rock outcrop.											
31 Dotsero	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
32 Dotsero	Fair	Fair	Fair	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
33*:											
Earsman-----------	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Rock outcrop.											
34, 35, 36--------- Empedrado	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
37----------------- Etoe	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	---
38----------------- Evanston	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
39, 40, 41--------- Evanston	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
42*---------------- Fluvaquents	Poor	Poor	Fair	---	---	Fair	Fair	Poor	Poor	Fair	Poor.
43*, 44*:											
Forelle-----------	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Brownsto----------	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
45, 46, 47--------- Forsey	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.	Fair.
48----------------- Fughes	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
49----------------- Goslin	Fair	Good	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	---
50----------------- Goslin	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
51, 52------------- Gothic	Poor	Poor	Good	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
53----------------- Gothic	Very poor.	Very poor.	Good	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
54----------------- Grotte	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	---	Very poor.	Very poor.	Fair.
55*: Gypsum land.											
Gypsiorthids------	Very poor.	Very poor.	Poor	---	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Poor.
56----------------- Ipson	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
57----------------- Ipson	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
58-----------------Irrawaddy	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
59-----------------Iyers	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
60-----------------Iyers	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
61-----------------Iyers	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
62-----------------Iyers	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
63-----------------Jerry	Poor	Poor	Good	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
64-----------------Jerry	Very poor.	Very poor.	Good	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
65*, 66*:											
Jerry--------------	Poor	Poor	Good	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Millerlake---------	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
67*:											
Jerry--------------	Very poor.	Very poor.	Good	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Millerlake---------	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
68-----------------Jodero	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
69-----------------Kilgore	Very poor.	Fair	Fair	Very poor.	Fair	Good	Good	Fair	---	Good	Fair.
70-----------------Kobar	Poor	Fair	Fair	Poor	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
71-----------------Kobar	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
72, 73-------------Kobar	Poor	Poor	Fair	Poor	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
74-----------------Leavittville	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Poor.
75-----------------Millerlake	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
76, 77-------------Mine	Poor	Poor	Good	Good	Fair	Very poor.	Very poor.	Poor	Good	Very poor.	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
78------------------ Miracle	Poor	Poor	Good	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
79, 80, 81--------- Moen	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
82------------------ Monad	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
83------------------ Monad	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
84, 85, 86--------- Morval	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
87*:											
Morval-------------	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Tridell------------	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Poor.
88*:											
Moyerson-----------	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Rock outcrop.											
89, 90------------- Mussel	Fair	Good	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
91------------------ Mussel	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
92------------------ Redrob	Fair	Fair	Good	---	Good	Good	Good	Fair	Fair	Good	Fair.
93------------------ Rogert	Very poor.	Very poor.	Poor	Fair	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Poor.
94*, 95*:											
Showalter----------	Very poor.	Very poor.	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	Fair.
Morval-------------	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
96, 97, 98, 99----- Southace	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
100*:											
Starley------------	Very poor.	Very poor.	Poor	---	Fair	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Starman------------	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
101*:											
Tanna--------------	Fair	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
101*:											
Pinelli	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
102*:											
Tanna	Fair	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Pinelli	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
103*:											
Tanna	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Pinelli	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
104*:											
Torriorthents	Poor	Very poor.	Fair	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Fair.
Camborthids	Poor	Very poor.	Fair	---	Poor	Poor	Very poor.	Poor	Poor	Poor	Poor.
Rock outcrop.											
105*:											
Torriorthents	Poor	Very poor.	Fair	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Fair.
Rock outcrop.											
106*:											
Tridell	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Poor.
Brownsto	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	Fair.
107*:											
Uracca	Very poor.	Very poor.	Poor	Poor	Fair	---	---	Very poor.	Very poor.	---	Poor.
Mergel	Poor	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
108*, 109*, 110*:											
Uracca	Very poor.	Very poor.	Poor	Poor	Fair	---	---	Very poor.	Very poor.	---	Poor.
Mergel	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
111 Vandamore	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
112 Woodhall	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
113----------------- Woosley	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
114, 115----------- Yamo	Fair	Fair	Poor	---	Poor	Very poor.	Very poor.	Fair	---	Very poor.	Poor.
116----------------- Yamo	Poor	Poor	Poor	---	Poor	Very poor.	Very poor.	Poor	---	Very poor.	Poor.
117*:											
Yeljack-----------	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
Callings----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.	Good.
118----------------- Youga	Very poor.	Poor	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
119----------------- Zillman	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1----------------- Acree	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: large stones.
2----------------- Acree	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
3----------------- Acree	Moderate: too clayey.	Severe: shrink-swell.	Moderate: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
4----------------- Acree	Moderate: too clayey, slope.	Severe: shrink-swell.	Moderate: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
5----------------- Acree	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
6----------------- Almy	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Slight.
7----------------- Almy	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
8*, 9*:						
Ansel------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Anvik------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
10*, 11*:						
Anvik------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Skylick----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sligting---------	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
12*:						
Arle-------------	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
Ansari-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
12*:						
Rock outcrop.						
13*:						
Atencio----------	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Moderate: droughty.
Azeltine---------	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: small stones, droughty.
14*:						
Callings---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Yeljack----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
15*, 16*:						
Charcol----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Mord-------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Slight.
17*:						
Cochetopa--------	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
Antrobus---------	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.
18*, 19*:						
Cochetopa--------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
Antrobus---------	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
20---------------- Coulterg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
21*:						
Curecanti--------	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, frost action, large stones.	Severe: large stones.
Fughes-----------	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: large stones, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
22*:						
Curecanti	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Fughes	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
23, 24 Cushool	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
25*:						
Cushool	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rentsac	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
26*:						
Dahlquist	Severe: cutbanks cave, large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: droughty.
Southace	Severe: cutbanks cave, large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones, droughty.
27*, 28*:						
Dahlquist	Severe: cutbanks cave, large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: droughty, slope.
Southace	Severe: cutbanks cave, large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, droughty, slope.
29*, 30*:						
Dollard	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
Rock outcrop.						
31 Dotsero	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
32 Dotsero	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
33*:						
Earsman	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: droughty, slope.
Rock outcrop.						

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
34---------------- Empedrado	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: large stones.
35---------------- Empedrado	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
36---------------- Empedrado	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
37---------------- Etoe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
38---------------- Evanston	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
39, 40, 41-------- Evanston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
42*--------------- Fluvaquents	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness.
43*:						
Forelle----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
Brownsto---------	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty, slope.
44*:						
Forelle----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Brownsto---------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
45---------------- Forsey	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action, large stones.	Severe: large stones.
46, 47------------ Forsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
48---------------- Fughes	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: large stones.
49---------------- Goslin	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
50---------------- Goslin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
51----------------- Gothic	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
52, 53------------ Gothic	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
54----------------- Grotte	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
55*: Gypsum land.						
Gypsiorthids-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, thin layer.
56----------------- Ipson	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, slope, frost action.	Moderate: large stones, slope.
57----------------- Ipson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
58----------------- Irrawaddy	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
59, 60, 61, 62---- Iyers	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
63, 64------------ Jerry	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
65*: Jerry------------	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Millerlake-------	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
66*, 67*: Jerry------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
Millerlake-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
68----------------- Jodero	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
69 Kilgore	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.
70 Kobar	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
71 Kobar	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
72 Kobar	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
73 Kobar	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
74 Leavittville	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
75 Millerlake	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
76, 77 Mine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
78 Miracle	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
79 Moen	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Moderate: depth to rock, low strength.	Moderate: small stones, thin layer.
80 Moen	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, low strength, slope.	Moderate: small stones, slope.
81 Moen	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
82, 83 Monad	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
84 Morval	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.	Slight.
85, 86 Morval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
87*:						
Morval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
87*:						
Tridell----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
88*:						
Moyerson---------	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope, thin layer.
Rock outcrop.						
89---------------- Mussel	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
90---------------- Mussel	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
91---------------- Mussel	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
92---------------- Redrob	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Moderate: wetness.
93---------------- Rogert	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, slope.
94*:						
Showalter--------	Moderate: too clayey, large stones, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, frost action, shrink-swell.	Severe: large stones.
Morval-----------	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
95*:						
Showalter--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Morval-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
96---------------- Southace	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Severe: droughty.
97---------------- Southace	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Severe: droughty.
98, 99------------ Southace	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
100*:						
Starley----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.
Starman----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.
101*:						
Tanna------------	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: depth to rock.
Pinelli----------	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
102*:						
Tanna------------	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope, depth to rock.
Pinelli----------	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.
103*:						
Tanna------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
Pinelli----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
104*:						
Torriorthents----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Camborthids------	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
Rock outcrop.						
105*:						
Torriorthents----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Rock outcrop.						
106*:						
Tridell----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
106*:						
Brownsto	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
107*:						
Uracca	Severe: cutbanks cave, large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones, droughty.
Mergel	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: large stones, droughty.
108*:						
Uracca	Severe: cutbanks cave, large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones, droughty.
Mergel	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Moderate: large stones, droughty, slope.
109*, 110*:						
Uracca	Severe: cutbanks cave, large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, droughty, slope.
Mergel	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.
111 Vandamore	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
112 Woodhall	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
113 Woosley	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
114 Yamo	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
115 Yamo	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
116 Yamo	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
117*:						
Yeljack	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
117*:						
Callings----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
118---------------- Youga	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
119---------------- Zillman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1 Acree	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Slight	Poor: too clayey.
2 Acree	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, slope.
3 Acree	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
4 Acree	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
5 Acree	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, slope.
6 Almy	Moderate: percs slowly.	Severe: seepage.	Slight	Slight	Good.
7 Almy	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: slope.
8*, 9*:					
Ansel	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Anvik	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: large stones, slope.
10*, 11*:					
Anvik	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: large stones, slope.
Skylick	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Sligting	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Severe: slope, too clayey, large stones.	Severe: slope.	Poor: too clayey, large stones, slope.
12*:					
Arle	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
12*:					
Ansari-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Rock outcrop.					
13*:					
Atencio------------	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Azeltine-----------	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
14*:					
Callings-----------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.
Yeljack------------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
15*, 16*:					
Charcol------------	Severe: slope.	Severe: seepage, slope.	Severe: slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Mord---------------	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: slope, too clayey.	Severe: seepage, slope.	Poor: too clayey, hard to pack, small stones.
17*:					
Cochetopa----------	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack, small stones.
Antrobus-----------	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: large stones.
18*, 19*:					
Cochetopa----------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, small stones.
Antrobus-----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.
20----------------- Coulterg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
21*:					
Curecanti	Severe: poor filter.	Severe: seepage, slope, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: small stones.
Fughes	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
22*:					
Curecanti	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Fughes	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, slope.
23, 24 Cushool	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
25*:					
Cushool	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Rentsac	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: depth to rock, small stones, slope.
26*:					
Dahlquist	Severe: poor filter, large stones.	Severe: seepage, slope.	Severe: large stones.	Moderate: slope.	Poor: seepage, large stones.
Southace	Severe: poor filter, large stones.	Severe: seepage, slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: large stones.
27*, 28*:					
Dahlquist	Severe: poor filter, slope, large stones.	Severe: seepage, slope.	Severe: slope, large stones.	Severe: slope.	Poor: seepage, large stones, slope.
Southace	Severe: poor filter, slope, large stones.	Severe: seepage, slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.
29*, 30*:					
Dollard	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
29*, 30*:					
Rock outcrop.					
31------------------ Dotsero	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
32------------------ Dotsero	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
33*:					
Earsman------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					
34------------------ Empedrado	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
35------------------ Empedrado	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
36------------------ Empedrado	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
37------------------ Etoe	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.
38------------------ Evanston	Moderate: percs slowly.	Moderate: seepage, slope.	Slight-----------	Slight-----------	Good.
39, 40, 41---------- Evanston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
42*----------------- Fluvaquents	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
43*:					
Forelle------------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Brownsto-----------	Moderate: slope.	Severe: seepage, slope.	Moderate: slope, too sandy.	Moderate: slope.	Poor: small stones.
44*:					
Forelle------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Brownsto-----------	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
45 Forsey	Moderate: percs slowly, large stones.	Severe: slope, large stones.	Severe: large stones.	Slight	Poor: small stones.
46, 47 Forsey	Severe: slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope.
48 Fughes	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Slight	Poor: too clayey.
49 Goslin	Slight	Severe: seepage.	Slight	Slight	Fair: small stones.
50 Goslin	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: slope.
51 Gothic	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
52, 53 Gothic	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
54 Grotte	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
55*: Gypsum land.					
Gypsiorthids	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
56 Ipson	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: slope.	Poor: small stones.
57 Ipson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
58 Irrawaddy	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
59, 60, 61, 62 Iyers	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
63, 64 Jerry	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
65*:					
Jerry	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack, small stones.
Millerlake	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
66*, 67*:					
Jerry	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, small stones.
Millerlake	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
68 Jodero	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
69 Kilgore	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
70 Kobar	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
71 Kobar	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
72 Kobar	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
73 Kobar	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
74 Leavittville	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: area reclaim, small stones, slope.
75 Millerlake	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
76, 77 Mine	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
78 Miracle	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
79 Moen	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
80------------------ Moen	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
81------------------ Moen	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
82, 83-------------- Monad	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: slope.
84------------------ Morval	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, small stones.
85, 86-------------- Morval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
87*:					
Morval-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Tridell------------	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope.
88*:					
Moyerson-----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Rock outcrop.					
89------------------ Mussel	Moderate: percs slowly.	Moderate: seepage, slope.	Slight-----------	Slight-----------	Good.
90------------------ Mussel	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
91------------------ Mussel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
92------------------ Redrob	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
93------------------ Rogert	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, seepage, small stones.
94*:					
Showalter----------	Severe: percs slowly.	Severe: slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
94*:					
Morval	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones, slope.
95*:					
Showalter	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope.
Morval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
96 Southace	Moderate: large stones.	Severe: seepage, large stones.	Severe: large stones.	Slight	Poor: small stones.
97 Southace	Moderate: slope, large stones.	Severe: seepage, slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: small stones.
98, 99 Southace	Severe: slope.	Severe: seepage, slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope.
100*:					
Starley	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
Starman	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
101*:					
Tanna	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Slight	Poor: depth to rock.
Pinelli	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
102*:					
Tanna	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Moderate: slope.	Poor: depth to rock.
Pinelli	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
103*:					
Tanna	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
103*:					
Pinelli	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
104*:					
Torriorthents	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: depth to rock, small stones, slope.
Camborthids	Variable	Variable	Variable	Variable	Variable.
Rock outcrop.					
105*:					
Torriorthents	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: depth to rock, small stones, slope.
Rock outcrop.					
106*:					
Tridell	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope.
Brownsto	Severe: slope.	Severe: seepage, slope, large stones.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
107*:					
Uracca	Severe: poor filter, large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: seepage, large stones.
Mergel	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight	Poor: large stones.
108*:					
Uracca	Severe: poor filter, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: seepage, large stones.
Mergel	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: large stones.
109*, 110*:					
Uracca	Severe: poor filter, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: seepage, large stones, slope.
Mergel	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
111----------------- Vandamore	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
112----------------- Woodhall	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
113----------------- Woosley	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
114----------------- Yamo	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, small stones.
115----------------- Yamo	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones, slope.
116----------------- Yamo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
117*:					
Yeljack------------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Callings-----------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.
118----------------- Youga	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
119----------------- Zillman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: seepage, slope.	Poor: small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1 Acree	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
2 Acree	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
3, 4 Acree	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
5 Acree	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
6 Almy	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
7 Almy	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
8*:				
Ansel	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Anvik	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
9*:				
Ansel	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Anvik	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
10*:				
Anvik	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Skylick	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Sligting	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
11*:				
Anvik	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Skylick	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Sligting	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
12*:				
Arle	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
Ansari	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
13*:				
Atencio	Good	Probable	Probable	Poor: small stones, area reclaim.
Azeltine	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
14*:				
Callings	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Yeljack	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
15*:				
Charcol	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Mord	Poor: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
16*:				
Charcol	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Mord	Poor: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
17*:				
Cochetopa	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Antrobus	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.
18*:				
Cochetopa	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Antrobus	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
19*:				
Cochetopa	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Antrobus	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
20 Coulterg	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
21*:				
Curecanti	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Fughes	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
22*:				
Curecanti	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
22*:				
Fughes	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
23 Cushool	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
24 Cushool	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
25*:				
Cushool	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rentsac	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
26*:				
Dahlquist	Poor: large stones.	Improbable: small stones, large stones.	Improbable: large stones.	Poor: area reclaim, small stones.
Southace	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.
27*:				
Dahlquist	Poor: large stones.	Improbable: small stones, large stones.	Improbable: large stones.	Poor: area reclaim, small stones, slope.
Southace	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
28*:				
Dahlquist	Poor: large stones, slope.	Improbable: small stones, large stones.	Improbable: large stones.	Poor: area reclaim, small stones, slope.
Southace	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
29*:				
Dollard	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Rock outcrop.				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
30*:				
Dollard	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Rock outcrop.				
31 Dotsero	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
32 Dotsero	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
33*:				
Earsman	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
34, 35 Empedrado	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
36 Empedrado	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
37 Etoe	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim, slope.
38 Evanston	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
39 Evanston	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
40, 41 Evanston	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
42* Fluvaquents	Poor: wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
43*:				
Forelle	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
Brownsto	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
44*:				
Forelle	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
44*:				
Brownsto	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
45 Forsey	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
46 Forsey	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
47 Forsey	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
48 Fughes	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
49 Goslin	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
50 Goslin	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
51 Gothic	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
52 Gothic	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
53 Gothic	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
54 Grotte	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
55*:				
Gypsum land.				
Gypsiorthids	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
56 Ipson	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
57: Ipson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
58: Irrawaddy	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
59: Iyers	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
60: Iyers	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
61: Iyers	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
62: Iyers	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
63: Jerry	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
64: Jerry	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
65*:				
Jerry	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Millerlake	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
66*:				
Jerry	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Millerlake	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
67*:				
Jerry	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
67*:				
Millerlake	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
68 Jodero	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
69 Kilgore	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
70, 71 Kobar	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
72 Kobar	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
73 Kobar	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
74 Leavittville	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
75 Millerlake	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
76 Mine	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
77 Mine	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
78 Miracle	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
79, 80 Moen	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
81 Moen	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
82 Monad	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
83 Monad	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
84 Morval	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
85 Morval	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
86 Morval	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
87*:				
Morval	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Tridell	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
88*:				
Moyerson	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Rock outcrop.				
89 Mussel	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
90 Mussel	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
91 Mussel	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
92 Redrob	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
93 Rogert	Poor: depth to rock, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: depth to rock, small stones, slope.
94*:				
Showalter	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Morval	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
95*:				
Showalter	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
95*:				
Morval	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
96, 97 Southace	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
98 Southace	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
99 Southace	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
100*:				
Starley	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Starman	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
101*, 102*:				
Tanna	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Pinelli	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
103*:				
Tanna	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Pinelli	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
104*:				
Torriorthents	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Camborthids	Variable	Variable	Variable	Variable.
Rock outcrop.				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
105*:				
Torriorthents	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
106*:				
Tridell	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Brownsto	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
107*, 108*:				
Uracca	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim.
Mergel	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.
109*:				
Uracca	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.
Mergel	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
110*:				
Uracca	Poor: large stones, slope.	Improbable: large stones.	Improbable: large stones.	Poor: large stones, area reclaim, slope.
Mergel	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
111 Vandamore	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
112 Woodhall	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope.
113 Woosley	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
114, 115 Yamo	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
116 Yamo	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
117*:				
Yeljack	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Callings	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
118 Youga	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
119 Zillman	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
1----------------- Acree	Moderate: slope.	Slight---------	Deep to water	Soil blowing, percs slowly, slope.	Soil blowing, percs slowly.	Percs slowly.
2----------------- Acree	Severe: slope.	Slight---------	Deep to water	Soil blowing, percs slowly, slope.	Slope, soil blowing, percs slowly.	Slope, percs slowly.
3----------------- Acree	Moderate: slope.	Moderate: piping.	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.
4, 5-------------- Acree	Severe: slope.	Moderate: piping.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
6----------------- Almy	Severe: seepage.	Severe: piping.	Deep to water	Slope, excess salt.	Erodes easily	Too arid, erodes easily.
7----------------- Almy	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, excess salt.	Slope, erodes easily.	Too arid, slope, erodes easily.
8*, 9*:						
Ansel------------	Severe: slope.	Moderate: piping, large stones.	Deep to water	Slope, erodes easily.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
Anvik------------	Severe: slope.	Moderate: piping, large stones.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
10*, 11*:						
Anvik------------	Severe: slope.	Moderate: piping, large stones.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
Skylick----------	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
Sligting---------	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, percs slowly.	Large stones, slope, droughty.
12*:						
Arle-------------	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Ansari-----------	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope.
Rock outcrop.						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
13*:						
Atencio	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, soil blowing, slope.	Large stones, too sandy.	Large stones, droughty.
Azeltine	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty, rooting depth.	Large stones, too sandy.	Too arid, large stones.
14*:						
Callings	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones.	Large stones, slope, droughty.
Yeljack	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
15*, 16*:						
Charcol	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Mord	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
17*, 18*, 19*:						
Cochetopa	Severe: slope.	Moderate: hard to pack, large stones.	Deep to water	Percs slowly, slope.	Slope, large stones, percs slowly.	Large stones, slope, percs slowly.
Antrobus	Severe: slope.	Severe: piping, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
20 Coulterg	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
21*, 22*:						
Curecanti	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, too sandy.	Large stones, slope, droughty.
Fughes	Severe: slope.	Slight	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
23, 24 Cushool	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, soil blowing, depth to rock.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
25*:						
Cushool	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rentsac	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Too arid, large stones, slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
26*, 27*, 28*:						
Dahlquist	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, too sandy.	Too arid, large stones, slope.
Southace	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, too sandy.	Too arid, large stones, slope.
29*, 30*:						
Dollard	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.						
31 Dotsero	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope	Slope, droughty.
32 Dotsero	Severe: seepage.	Moderate: seepage.	Deep to water	Droughty, slope.	Favorable	Droughty.
33*:						
Earsman	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.						
34 Empedrado	Severe: seepage.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
35, 36 Empedrado	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
37 Etoe	Severe: slope.	Severe: large stones.	Deep to water	Slope, large stones, erodes easily.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
38 Evanston	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Too arid, erodes easily.
39, 40, 41 Evanston	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Too arid, slope, erodes easily.
42* Fluvaquents	Severe: seepage.	Severe: seepage, wetness.	Flooding, large stones, frost action.	Slope, wetness, droughty.	Large stones, wetness.	Large stones, wetness.
43*, 44*:						
Forelle	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Too arid, slope, erodes easily.
Brownsto	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Too arid, slope, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
45---------------- Forsey	Moderate: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Large stones---	Large stones, droughty.
46, 47------------ Forsey	Severe: slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
48---------------- Fughes	Moderate: slope.	Slight---------	Deep to water	Slope, percs slowly.	Percs slowly---	Percs slowly.
49---------------- Goslin	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, slope.	Soil blowing---	Favorable.
50---------------- Goslin	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, slope.	Slope, soil blowing.	Slope.
51---------------- Gothic	Moderate: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.
52, 53------------ Gothic	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
54---------------- Grotte	Severe: slope.	Slight---------	Deep to water	Droughty, slope.	Slope----------	Slope, droughty.
55*: Gypsum land.						
Gypsiorthids-----	Severe: depth to rock, slope.	Severe: seepage, piping.	Deep to water	Depth to rock, slope, erodes easily.	Slope, depth to rock, erodes easily.	Slope, excess salt, erodes easily.
56, 57------------ Ipson	Severe: slope.	Moderate: large stones.	Deep to water	Slope----------	Slope, large stones.	Too arid, large stones, slope.
58---------------- Irrawaddy	Severe: slope.	Severe: seepage.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
59, 60, 61, 62---- Iyers	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
63, 64------------ Jerry	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, slope.	Slope, large stones.	Large stones, slope, percs slowly.
65*: Jerry------------	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Percs slowly, slope.	Large stones---	Large stones, percs slowly.
Millerlake--------	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope----------	Favorable------	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
66*, 67*:						
Jerry	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, slope.	Slope, large stones.	Large stones, slope, percs slowly.
Millerlake	Severe: slope.	Severe: thin layer.	Deep to water	Slope	Slope	Slope.
68 Jodero	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
69 Kilgore	Severe: seepage.	Severe: seepage, wetness.	Flooding, large stones, slope.	Wetness, slope, flooding.	Large stones, wetness, too sandy.	Wetness.
70 Kobar	Moderate: slope.	Slight	Deep to water	Slope, percs slowly, erodes easily.	Erodes easily, percs slowly.	Too arid, erodes easily.
71, 72, 73 Kobar	Severe: slope.	Slight	Deep to water	Slope, percs slowly, erodes easily.	Slope, erodes easily, percs slowly.	Too arid, slope, erodes easily.
74 Leavittville	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
75 Millerlake	Severe: slope.	Severe: thin layer.	Deep to water	Slope	Slope	Slope.
76, 77 Mine	Severe: seepage, slope.	Moderate: thin layer, seepage, piping.	Deep to water	Droughty, slope.	Slope	Slope, droughty.
78 Miracle	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
79 Moen	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
80, 81 Moen	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
82, 83 Monad	Severe: slope.	Moderate: piping.	Deep to water	Soil blowing, slope.	Slope, erodes easily, soil blowing.	Slope, erodes easily.
84 Morval	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
85, 86 Morval	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
87*:						
Morval	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Tridell	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Too arid, large stones, slope.
88*:						
Moyerson	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Rock outcrop.						
89 Mussel	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
90, 91 Mussel	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
92 Redrob	Severe: seepage.	Severe: seepage, wetness.	Large stones, slope, cutbanks cave.	Wetness, slope.	Large stones, wetness, too sandy.	Favorable.
93 Rogert	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
94*, 95*:						
Showalter	Severe: slope.	Severe: large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
Morval	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
96 Southace	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Large stones, soil blowing.	Too arid, large stones.
97, 98, 99 Southace	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, soil blowing.	Too arid, large stones, slope.
100*:						
Starley	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Starman	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
101*:						
Tanna	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Depth to rock, erodes easily.	Too arid, erodes easily.
Pinelli	Moderate: slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Too arid, erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
102*, 103*:						
Tanna	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Too arid, slope, erodes easily.
Pinelli	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Too arid, slope, erodes easily.
104*:						
Torriorthents	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, large stones, depth to rock.	Too arid, large stones, slope.
Camborthids	Variable	Variable	Variable	Variable	Variable	Variable.
Rock outcrop.						
105*:						
Torriorthents	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, large stones, depth to rock.	Too arid, large stones, slope.
Rock outcrop.						
106*:						
Tridell	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Too arid, large stones, slope.
Brownsto	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones.	Slope, large stones.	Too arid, large stones, slope.
107*:						
Uracca	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Large stones	Large stones, droughty.
Mergel	Moderate: seepage, slope.	Severe: piping, large stones.	Deep to water	Large stones, droughty, slope.	Large stones	Large stones, droughty.
108*, 109*, 110*:						
Uracca	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Mergel	Severe: slope.	Severe: piping, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
111 Vandamore	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
112 Woodhall	Severe: slope.	Severe: piping, large stones.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
113 Woosley	Severe: slope.	Severe: slope.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
114 Yamo	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
115, 116 Yamo	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
117*:						
Yeljack	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Callings	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones.	Large stones, slope, droughty.
118 Youga	Severe: slope.	Moderate: large stones.	Deep to water	Slope	Slope, large stones.	Large stones, slope.
119 Zillman	Severe: slope.	Slight	Deep to water	Droughty, slope.	Slope	Slope, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1, 2------------- Acree	0-5	Very stony sandy loam.	SM, SP-SM GP-GM, GM	A-2, A-1	30-45	15-70	15-70	10-50	5-30	20-30	NP-5
	5-10	Loam, clay loam	CL-ML, CL	A-6, A-4	0-5	90-100	90-100	70-95	60-80	25-35	5-15
	10-60	Clay, clay loam	CL, CH	A-7	0-5	75-100	75-100	70-95	65-95	40-60	20-35
3---------------- Acree	0-10	Loam-------------	ML, CL-ML	A-4	0	90-100	90-100	85-100	60-80	20-30	NP-10
	10-27	Clay, clay loam, gravelly clay loam.	CL, CH	A-7	0-15	75-100	70-100	60-95	55-90	40-60	20-35
	27-60	Clay loam, clay, gravelly clay loam.	CL	A-6, A-7	0-15	75-100	70-100	60-80	55-75	30-45	10-25
4, 5------------- Acree	0-10	Loam-------------	ML, CL-ML	A-4	0	90-100	90-100	85-100	60-80	20-30	NP-10
	10-27	Clay, clay loam, gravelly clay loam.	CL, CH	A-7	0-15	75-100	70-100	60-95	55-90	40-60	20-35
	27-60	Clay loam, clay, gravelly clay loam.	CL	A-6, A-7	0-15	75-100	70-100	60-80	55-75	30-45	10-25
6, 7------------- Almy	0-8	Loam-------------	CL	A-6	0	80-100	75-100	55-80	50-65	30-35	10-15
	8-26	Clay loam, sandy clay loam, loam.	CL, CL-ML	A-6, A-4	0	80-100	75-100	55-80	50-70	25-40	5-15
	26-60	Fine sandy loam, loam.	SM-SC, SM, CL-ML, ML	A-4	0	80-100	75-100	55-80	40-55	20-30	NP-10
8*, 9*:											
Ansel-----------	0-23	Loam-------------	CL-ML	A-4	0-5	100	90-100	65-85	50-75	25-30	5-10
	23-48	Stony clay loam, stony sandy clay loam.	CL, SC	A-6	15-35	100	90-100	55-85	35-70	30-35	10-15
	48-60	Clay loam--------	CL	A-6	0-5	100	90-100	65-85	55-75	30-35	10-15
Anvik-----------	0-12	Loam-------------	CL-ML	A-4	0	90-100	85-100	75-95	50-70	25-30	5-10
	12-18	Sandy loam, loam	CL-ML, SM-SC, ML, SM	A-4, A-2	0	90-100	85-95	65-75	30-60	20-30	NP-10
	18-42	Clay loam, cobbly loam, cobbly clay loam.	CL	A-6	5-30	90-100	75-95	70-90	55-75	30-40	10-20
	42-60	Loam, cobbly clay loam, sandy clay loam.	CL, SC	A-6	5-30	75-100	75-95	55-85	40-70	30-40	10-20
10*, 11*:											
Anvik-----------	0-12	Loam-------------	CL-ML	A-4	0	90-100	85-100	75-95	50-70	25-30	5-10
	12-18	Sandy loam, loam	CL-ML, SM-SC, ML, SM	A-4, A-2	0	90-100	85-95	65-75	30-60	20-30	NP-10
	18-42	Clay loam, cobbly loam, cobbly clay loam.	CL	A-6	5-30	90-100	75-95	70-90	55-75	30-40	10-20
	42-60	Loam, cobbly clay loam, sandy clay loam.	CL, SC	A-6	5-30	75-100	75-95	55-85	40-70	30-40	10-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
10*, 11*:											
Skylick---------	0-31	Loam-------------	CL-ML	A-4	0	90-100	85-100	70-90	55-75	20-30	5-10
	31-48	Clay loam, loam	CL	A-6	0	90-100	85-100	75-90	60-80	25-35	10-15
	48-60	Gravelly sandy clay loam.	CL, SC	A-6, A-2	0	65-85	55-75	40-65	30-55	25-35	10-15
Sligting--------	0-24	Very stony loam	CL-ML	A-4	20-40	75-85	70-80	60-70	50-60	25-35	5-10
	24-60	Extremely cobbly clay loam, very cobbly clay, very stony clay.	CL, SC	A-6, A-7	30-65	70-80	50-75	45-70	40-60	35-50	15-25
12*:											
Arle------------	0-10	Very stony loam	SM, GM, ML	A-4	25-40	60-85	55-80	45-70	35-55	25-35	NP-10
	10-30	Very stony loam, very stony sandy loam.	GM, SM	A-2, A-1	30-60	40-70	40-70	35-55	20-45	20-35	NP-10
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ansari----------	0-8	Loam-------------	CL-ML, SM-SC	A-4	5-10	75-100	75-90	70-80	45-65	20-30	5-10
	8-14	Loam, stony loam	CL-ML, SM-SC	A-4	5-30	75-95	75-90	70-80	45-65	20-30	5-10
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
13*:											
Atencio---------	0-10	Sandy loam-------	SM	A-2	0-5	75-100	75-100	50-65	20-30	15-20	NP-5
	10-24	Gravelly sandy clay loam, sandy clay loam, gravelly sandy loam.	SC	A-2, A-6	0-5	65-90	50-90	35-65	25-45	20-30	10-15
	24-30	Gravelly sandy clay loam, gravelly sandy loam.	SM-SC, GM-GC	A-2	5-10	50-80	50-75	40-65	15-30	15-25	5-10
	30-60	Extremely cobbly sand, very gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	20-60	40-60	35-55	10-35	0-10	---	NP
Azeltine--------	0-9	Gravelly sandy loam.	SM, SM-SC, GM, GM-GC	A-2, A-4	0-5	60-85	50-75	40-65	25-40	20-30	NP-10
	9-16	Gravelly sandy loam, gravelly loam.	GM-GC, SM-SC, GC, SC	A-2, A-4, A-6	0-5	60-85	50-75	40-65	25-50	25-35	5-15
	16-60	Extremely gravelly sand.	GP	A-1	15-30	25-40	20-35	10-20	0-5	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
14*:											
Callings--------	0-5	Loam-------------	CL-ML	A-4	0	80-90	75-85	60-75	50-70	20-30	5-10
	5-11	Gravelly loam, gravelly fine sandy loam, cobbly loam.	CL-ML, SM-SC	A-4	15-20	75-85	70-80	55-75	35-70	20-30	5-10
	11-33	Very gravelly clay loam, very cobbly clay, very cobbly clay loam.	GC	A-6, A-7	15-45	50-60	45-55	40-50	35-45	35-50	15-25
	33-60	Extremely cobbly clay loam, very gravelly clay loam, very gravelly sandy clay loam.	GC	A-2, A-6	25-65	40-55	35-50	30-45	25-40	30-40	10-15
Yeljack---------	0-9	Silt loam--------	ML	A-4	0	95-100	90-100	80-90	70-90	30-35	5-10
	9-31	Silty clay loam, clay loam.	CL	A-6	0	95-100	90-100	80-90	65-85	30-40	10-20
	31-60	Clay loam--------	CL	A-6	0	95-100	90-100	80-90	65-80	30-40	10-20
15*, 16*:											
Charcol---------	0-20	Very stony fine sandy loam.	GM, SM, GM-GC, SM-SC	A-2	15-35	60-75	55-70	50-65	25-35	20-30	NP-10
	20-46	Very cobbly loam, very stony loam.	GM-GC, GM	A-4, A-2	30-45	45-70	40-65	40-60	30-50	20-30	NP-10
	46-60	Very cobbly sandy clay loam.	GC, SC	A-2	30-45	45-70	40-65	20-55	10-35	30-40	10-20
Mord------------	0-10	Fine sandy loam	ML, SM	A-4	0-5	80-90	75-85	60-75	40-60	20-25	NP-5
	10-21	Gravelly clay loam, sandy clay loam.	CL, GC	A-6	0-5	60-85	60-80	45-70	40-60	30-40	10-15
	21-40	Gravelly clay, cobbly clay.	CL, CH, GC	A-7	0-15	55-75	50-75	50-70	45-65	40-60	15-30
	40-60	Gravelly clay loam, cobbly clay.	CL, GC, SC	A-6, A-7	0-20	55-75	50-75	45-70	45-55	30-50	15-25
17*, 18*, 19*:											
Cochetopa-------	0-3	Loam-------------	ML	A-4	0-5	85-100	80-95	70-90	50-80	20-30	NP-5
	3-38	Clay, stony clay loam, clay loam.	CL, CH	A-7	5-20	75-90	70-90	60-85	50-80	40-60	20-40
	38-60	Clay loam, stony clay, gravelly clay loam.	CL	A-6, A-7	10-40	75-95	70-90	65-80	50-70	30-50	10-30
Antrobus--------	0-13	Very stony loam	ML, GM	A-4	30-55	65-90	65-85	55-80	40-65	25-35	NP-10
	13-60	Very stony loam, extremely stony loam, very stony clay loam.	GC, GM-GC, CL, CL-ML	A-4, A-6	50-80	65-90	60-90	50-80	40-60	25-35	5-15
20--------------- Coulterg	0-14	Loam-------------	CL-ML, ML	A-4	0	95-100	95-100	85-95	60-75	20-30	NP-10
	14-60	Loam, clay loam, sandy clay loam.	ML, CL-ML	A-4	0-5	85-100	75-100	65-95	50-75	20-30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
21*, 22*:											
Curecanti-------	0-10	Extremely stony loam.	SM	A-2, A-4, A-1	30-70	70-90	60-80	35-70	20-50	15-25	NP-5
	10-60	Extremely stony sandy clay loam, extremely stony clay loam, extremely cobbly clay loam.	SM-SC, SC, GM-GC, GC	A-2, A-4, A-6	40-65	50-70	45-65	35-60	20-45	15-30	5-15
Fughes----------	0-10	Stony loam-------	CL-ML	A-4	5-25	95-100	90-100	70-90	60-80	25-30	5-10
	10-46	Clay, clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	75-95	70-90	35-50	15-30
	46-60	Clay loam, silty clay loam.	CL	A-6	0-5	95-100	90-100	75-90	65-80	30-40	10-20
23, 24----------- Cushool	0-7	Fine sandy loam	SM	A-2, A-4	0-5	90-95	85-90	70-80	20-50	20-30	NP-5
	7-26	Channery loam, loam.	CL-ML, SM-SC	A-4	5-10	65-85	60-85	55-80	45-70	25-30	5-10
	26-35	Extremely channery sandy loam, very channery sandy loam.	GM	A-1, A-2	5-15	30-60	25-50	20-45	10-30	15-25	NP-5
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
25*:											
Cushool---------	0-11	Loam-------------	CL-ML, ML	A-4	0-5	80-90	75-85	60-80	50-70	20-30	NP-10
	11-26	Channery loam, loam.	CL-ML, SM-SC	A-4	5-10	65-85	60-85	55-80	45-70	25-30	5-10
	26-35	Extremely channery sandy loam, very channery sandy loam.	GM	A-1, A-2	5-15	30-60	25-50	20-45	10-30	15-25	NP-5
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rentsac---------	0-6	Channery loam----	SM, ML, GM	A-4	0-15	70-85	60-75	45-65	35-55	20-25	NP-5
	6-18	Extremely channery loam, extremely gravelly sandy loam, very flaggy loam.	SM, GM	A-2, A-4, A-1	15-50	40-75	30-65	15-45	10-40	20-25	NP-5
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
26*, 27*, 28*:											
Dahlquist-------	0-6	Cobbly sandy loam	SM	A-2	15-30	70-90	70-80	45-50	25-35	20-30	NP-5
	6-13	Very cobbly sandy clay loam, extremely cobbly sandy clay loam.	GC, GM-GC, SC, SM-SC	A-2, A-1	15-40	25-65	20-50	15-45	10-30	25-35	5-15
	13-60	Very cobbly sandy loam, extremely cobbly loamy sand, extremely cobbly sandy loam.	GP-GM, GM	A-1	30-80	20-45	20-45	10-35	5-20	20-30	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
26*, 27*, 28*:											
Southace	0-10	Very stony sandy loam.	SM	A-2, A-4	15-35	90-100	85-95	55-90	25-50	20-25	NP-5
	10-22	Extremely stony sandy loam, very cobbly sandy loam.	SM	A-2, A-1	40-65	65-80	60-75	35-50	15-30	20-25	NP-5
	22-60	Extremely stony loamy coarse sand, very cobbly loamy sand.	SM, GM	A-1	35-60	55-80	50-75	10-50	10-25	---	NP
29*, 30*:											
Dollard	0-4	Clay loam	CL	A-6	0	95-100	95-100	90-100	80-95	35-50	15-30
	4-33	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	95-100	95-100	90-100	80-90	40-60	20-40
	33	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
31 Dotsero	0-31	Gravelly sandy loam.	SM, GM	A-1, A-2	0	60-80	55-75	35-50	15-35	15-20	NP-5
	31-41	Gravelly sandy loam.	SM, GM	A-1, A-2	0	60-80	55-75	35-50	15-30	15-20	NP-5
	41-60	Fine sandy loam, sandy loam, loam.	SM, SM-SC, ML, CL-ML	A-4	0	90-100	90-100	70-85	40-65	20-30	NP-10
32 Dotsero	0-7	Sandy loam	SM	A-1, A-2	0	80-100	75-95	40-60	20-35	15-20	NP-5
	7-41	Gravelly sandy loam.	SM, GM	A-1, A-2	0	60-80	55-75	35-50	15-30	15-20	NP-5
	41-60	Fine sandy loam, sandy loam, loam.	SM, SM-SC, ML, CL-ML	A-4	0	90-100	90-100	70-85	40-65	20-30	NP-10
33*:											
Earsman	0-5	Very stony sandy loam.	SM, GM	A-2, A-4	10-20	60-85	50-75	45-70	25-40	25-30	NP-5
	5-19	Very channery loam, very channery sandy loam, very channery fine sandy loam.	GM-GC	A-2	5-25	35-55	30-40	20-35	10-25	25-30	5-10
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
34, 35, 36 Empedrado	0-5	Loam	ML	A-4	0-10	95-100	95-100	80-95	55-75	30-35	5-10
	5-40	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-6	0-10	95-100	65-95	55-90	40-70	30-40	10-20
	40-60	Sandy loam, clay loam, gravelly loam.	SM, ML	A-2, A-4	0-10	95-100	70-100	55-80	25-60	25-30	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
37--------------- Etoe	0-8	Loam-------------	CL-ML	A-4	0-10	85-100	80-100	70-95	50-70	20-30	5-10
	8-24	Stratified very cobbly fine sandy loam to extremely cobbly sandy clay loam.	SM-SC, GM-GC	A-2	30-60	50-75	45-70	40-55	30-35	20-30	5-10
	24-60	Extremely cobbly sandy clay loam, extremely stony sandy clay loam, extremely stony loam.	GC, GP-GC	A-2	40-80	25-35	15-30	10-25	5-15	30-35	10-15
38, 39----------- Evanston	0-14	Loam-------------	ML	A-4	0	95-100	95-100	70-85	50-70	30-35	5-10
	14-31	Loam, clay loam	CL	A-6	0	95-100	95-100	70-90	50-70	25-35	10-15
	31-60	Loam-------------	CL-ML	A-4	0	95-100	95-100	65-85	50-60	20-30	5-10
40, 41----------- Evanston	0-12	Loam-------------	ML	A-4	0	95-100	95-100	70-85	50-70	30-35	5-10
	12-25	Loam, clay loam	CL	A-6	0	95-100	95-100	70-90	50-70	25-35	10-15
	25-60	Loam-------------	CL-ML	A-4	0	95-100	95-100	65-85	50-60	20-30	5-10
42*-------------- Fluvaquents	0-10	Variable---------	SM, ML, CL, SC	A-2, A-4, A-6	0-10	90-95	85-95	55-65	20-60	15-30	NP-15
	10-24	Stratified clay to gravelly sand.	SM, ML, CL, CL-ML	A-2, A-4, A-6	0-20	65-85	60-80	45-70	30-60	25-35	NP-15
	24-60	Very gravelly sand, gravelly sand.	GP, SP, SP-SM, GP-GM	A-1	10-30	40-80	30-70	10-25	0-10	---	NP
43*, 44*:											
Forelle---------	0-6	Loam-------------	CL-ML, ML	A-4	0-10	85-100	85-100	75-100	55-75	25-35	5-10
	6-30	Clay loam, loam, sandy clay loam.	CL	A-6	0-10	85-100	85-100	80-100	50-80	25-35	10-15
	30-60	Loam, sandy clay loam, clay loam.	CL-ML, CL	A-4, A-6	0-10	85-100	85-100	75-100	55-75	25-35	5-15
Brownsto--------	0-4	Gravelly sandy loam.	SM, GM, SM-SC, GM-GC	A-2	0-5	60-80	50-75	40-55	25-35	20-30	NP-10
	4-11	Gravelly loam----	SM-SC, GM-GC	A-4	0-5	60-80	50-75	40-60	35-50	25-30	5-10
	11-30	Very gravelly sandy loam.	GM, GM-GC	A-1, A-2	0-5	50-60	40-50	30-40	15-25	20-30	NP-10
	30-60	Gravelly sandy loam, very gravelly loamy sand, very gravelly sandy loam.	SM, GM	A-2, A-1	0-5	40-80	35-75	25-55	10-35	---	NP
45, 46, 47------- Forsey	0-10	Cobbly loam------	SM-SC, CL-ML	A-4	20-35	75-90	70-85	60-75	45-60	25-30	5-10
	10-22	Very cobbly loam, very cobbly clay loam.	GM-GC, GC	A-4, A-6	30-50	50-65	45-60	40-60	35-50	25-35	5-15
	22-60	Very cobbly sandy loam, very cobbly loam, very cobbly sandy clay loam.	GM, GM-GC, SM-SC, SM	A-1, A-2	35-50	50-70	45-65	30-55	15-35	20-30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
48--------------- Fughes	0-6	Stony loam-------	CL-ML	A-4	5-25	95-100	90-100	70-90	60-80	25-30	5-10
	6-50	Clay, clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	75-95	70-90	35-50	15-30
	50-60	Clay loam, silty clay loam.	CL	A-6	0-5	95-100	90-100	75-90	65-80	30-40	10-20
49, 50----------- Goslin	0-5	Fine sandy loam	SM-SC, SM	A-2, A-4	0	75-100	75-100	50-70	20-40	15-25	NP-10
	5-60	Fine sandy loam, gravelly fine sandy loam.	SM-SC, SM, GM-GC, GM	A-2, A-4	0	55-100	50-100	50-70	20-40	15-25	NP-10
51, 52, 53------- Gothic	0-12	Loam-------------	CL-ML	A-4	0	90-100	85-100	70-85	50-65	20-25	5-10
	12-34	Clay, clay loam, gravelly clay loam.	CL, CH, GC	A-7	0	50-100	50-100	45-95	40-90	40-55	25-35
	34-60	Clay loam, gravelly clay loam.	CL, GC	A-6, A-7	0	50-100	50-100	45-95	40-80	35-50	25-35
54--------------- Grotte	0-4	Gravelly loam----	ML, CL-ML, SM, SM-SC	A-4	0-5	55-80	50-75	45-65	35-55	15-25	NP-10
	4-7	Gravelly clay loam, channery loam.	CL-ML, CL, SC, SM-SC	A-4, A-6	0-5	55-80	50-75	45-65	40-60	20-30	5-15
	7-60	Very channery loam, very channery clay loam, very gravelly loam.	GM-GC, GC	A-4, A-6, A-2	0-10	35-55	30-50	25-45	20-40	20-30	5-15
55*: Gypsum land.											
Gypsiorthids----	0-8	Fine sandy loam	ML, SM, CL-ML, SM-SC	A-4, A-2	0-5	100	90-100	50-90	25-65	20-35	NP-10
	8-23	Fine sandy loam, loam.	ML, SM, CL-ML, SM-SC	A-4, A-2	0-5	100	90-100	50-90	25-60	20-35	NP-10
	23-39	Fine sandy loam, loam.	ML, SM	A-4, A-2	0-5	100	90-100	50-80	15-60	20-35	NP-10
	39	Weathered bedrock	---	---	---	---	---	---	---	---	---
56, 57----------- Ipson	0-14	Cobbly loam------	CL-ML	A-4	15-30	80-95	75-90	55-70	50-65	25-30	5-10
	14-26	Very gravelly sandy clay loam, very gravelly clay loam.	GC	A-6, A-2	15-30	55-65	50-60	30-50	25-45	30-35	10-15
	26-60	Very gravelly sandy clay loam, gravelly sandy clay loam.	GC, SC	A-6, A-2	10-15	50-75	45-70	30-50	20-40	30-35	10-15
58--------------- Irrawaddy	0-5	Very stony loam	SM-SC, SM, ML, CL-ML	A-4	20-50	85-100	85-100	60-80	45-65	20-30	NP-10
	5-14	Very channery loam.	GM, GM-GC	A-1, A-2, A-4	0-10	50-60	40-55	30-50	20-40	20-30	NP-10
	14-34	Very channery loam.	GM, GM-GC	A-1, A-2	0-15	40-60	25-50	20-45	15-35	20-30	NP-10
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
59, 60----------- Iyers	0-3	Loam------------	CL-ML	A-4	0	95-100	95-100	80-90	60-75	20-25	5-10
	3-37	Clay, silty clay, clay loam.	CL, CH	A-7	0-10	95-100	75-100	70-100	65-90	45-60	30-45
	37	Weathered bedrock	---	---	---	---	---	---	---	---	---
61, 62----------- Iyers	0-6	Silty clay loam	CL	A-6	0	95-100	90-95	75-90	70-85	30-40	10-20
	6-33	Clay, silty clay, clay loam.	CL, CH	A-7	0-10	95-100	75-100	70-100	65-90	45-60	30-45
	33	Weathered bedrock	---	---	---	---	---	---	---	---	---
63, 64----------- Jerry	0-11	Loam------------	ML, CL-ML	A-4	0	80-100	75-100	70-95	50-70	20-30	NP-10
	11-34	Gravelly loam, cobbly clay loam, channery clay loam.	GC, CL, CL-ML, GM-GC	A-2, A-4, A-6, A-7	5-30	60-90	60-75	40-70	30-60	20-45	5-25
	34-60	Cobbly sandy clay loam, cobbly sandy loam, very channery clay loam.	SM-SC	A-2, A-4	15-35	70-90	60-90	50-70	25-40	20-30	5-10
65*, 66*, 67*:											
Jerry-----------	0-11	Loam------------	ML, CL-ML	A-4	0	80-100	75-100	70-95	50-70	20-30	NP-10
	11-34	Gravelly loam, cobbly clay loam, channery clay loam.	GC, CL, CL-ML, GM-GC	A-2, A-4, A-6, A-7	5-30	60-90	60-75	40-70	30-60	20-45	5-25
	34-60	Cobbly sandy clay loam, cobbly sandy loam, very channery clay loam.	SM-SC	A-2, A-4	15-35	70-90	60-90	50-70	25-40	20-30	5-10
Millerlake------	0-19	Loam------------	CL-ML	A-4	0	75-100	75-100	65-95	50-75	25-30	5-10
	19-44	Clay loam, loam	CL	A-6	0	75-100	75-100	70-95	55-80	30-40	10-15
	44-60	Very cobbly loam, cobbly loam.	CL-ML	A-4	25-55	75-100	75-100	65-95	50-75	25-30	5-10
68--------------- Jodero	0-15	Loam------------	ML	A-4	0-5	95-100	80-100	70-95	50-75	25-40	NP-10
	15-60	Stratified clay loam to fine sandy loam.	ML, SM	A-4	0-5	95-100	80-100	70-90	45-65	25-35	NP-10
69--------------- Kilgore	0-4	Silt loam--------	CL	A-6	0	95-100	90-95	75-90	70-80	30-35	10-15
	4-25	Silt loam, loam, clay loam.	CL-ML, CL	A-6, A-4	0	95-100	85-95	75-90	70-80	25-40	5-20
	25-29	Very gravelly sandy loam, very gravelly coarse sandy loam.	SM, GM	A-1	10-15	50-60	30-45	20-30	10-20	15-20	NP-5
	29-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM, GM, SP	A-1	10-30	35-55	30-50	15-35	0-15	---	NP
70, 71, 72, 73--- Kobar	0-3	Silty clay loam	CL	A-6, A-7	0	95-100	90-100	90-100	85-95	35-45	15-25
	3-35	Silty clay loam, silty clay.	CL	A-7	0	95-100	90-100	90-100	80-95	40-50	20-30
	35-60	Silty clay loam, silty clay, clay.	CL	A-7	0	95-100	90-100	90-100	80-95	40-50	20-30

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
74--------------- Leavittville	0-32	Loam-------------	CL-ML	A-4	0-5	80-100	75-100	65-80	60-75	25-30	5-10
	32-50	Gravelly clay loam, gravelly loam.	GM, ML	A-4, A-6	0-10	55-80	50-75	45-60	40-55	30-40	5-15
	50	Weathered bedrock	---	---	---	---	---	---	---	---	---
75--------------- Millerlake	0-19	Loam-------------	CL-ML	A-4	0	75-100	75-100	65-95	50-75	25-30	5-10
	19-44	Clay loam, loam	CL	A-6	0	75-100	75-100	70-95	55-80	30-40	10-15
	44-60	Very cobbly loam, cobbly loam.	CL-ML	A-4	25-55	75-100	75-100	65-95	50-75	25-30	5-10
76, 77----------- Mine	0-4	Loam-------------	CL-ML, SM-SC	A-4	0	80-100	75-100	50-90	40-75	25-30	5-10
	4-37	Gravelly sandy loam.	SM, GM	A-1	5-10	50-80	50-75	40-45	20-25	15-25	NP-5
	37-60	Very cobbly loamy sand, very gravelly sandy loam.	GP-GM, GM, SP-SM, SM	A-1	15-55	45-75	40-70	20-55	5-20	15-25	NP-5
78--------------- Miracle	0-3	Loam-------------	CL-ML, SM-SC	A-4	0	85-100	75-100	70-85	45-60	25-30	5-10
	3-18	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	80-100	75-100	70-90	40-55	25-35	10-15
	18-37	Fine sandy loam, very flaggy sandy clay loam.	SM, SM-SC	A-2, A-4	5-50	80-90	75-85	60-75	25-50	20-30	NP-10
	37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
79, 80, 81------- Moen	0-4	Stony loam-------	ML	A-4	5-10	70-85	60-75	55-70	50-60	20-25	NP-5
	4-22	Clay loam, gravelly loam, gravelly sandy clay loam.	CL, GC, SC	A-6, A-4	0-5	60-100	55-100	45-95	35-80	25-35	10-20
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
82, 83----------- Monad	0-2	Fine sandy loam	SM	A-2, A-4	0-5	85-100	80-100	55-85	30-50	15-25	NP-5
	2-37	Clay loam, loam, sandy clay loam.	CL-ML, CL	A-4, A-6	0-5	95-100	90-100	75-95	50-80	25-40	5-15
	37-60	Stony clay loam, clay loam.	CL	A-6	5-30	70-95	70-90	60-80	50-70	30-40	10-15
84, 85, 86------- Morval	0-7	Loam-------------	ML, CL-ML	A-4	0-5	90-100	86-96	60-80	50-75	25-30	NP-10
	7-23	Loam, clay loam	SC, CL	A-6	0-10	75-100	70-95	60-85	36-70	30-40	10-25
	23-60	Gravelly clay loam, clay loam, loam.	GC, SC, CL	A-6	0-10	65-90	60-85	40-65	35-55	25-35	10-20
87*:											
Morval-----------	0-7	Loam-------------	ML, CL-ML	A-4	0-5	90-100	86-96	60-80	50-75	25-30	NP-10
	7-23	Loam, clay loam	SC, CL	A-6	0-10	75-100	70-95	60-85	36-70	30-40	10-25
	23-60	Gravelly clay loam, clay loam, loam.	GC, SC, CL	A-6	0-10	65-90	60-85	40-65	35-55	25-35	10-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
87*:											
Tridell---------	0-2	Stony sandy loam	CL-ML, SM-SC	A-4, A-2	20-30	75-95	70-90	60-80	30-60	20-30	5-10
	2-37	Very cobbly loam, extremely gravelly sandy loam, very stony fine sandy loam.	GM, GM-GC	A-1, A-2	35-50	45-55	40-50	30-40	15-30	15-30	NP-10
	37-60	Very gravelly sand, very stony loamy sand, extremely cobbly sand.	GP	A-1	30-45	35-45	30-40	20-30	0-5	---	NP
88*:											
Moyerson--------	0-5	Silty clay loam	CL, CH	A-7	0-5	95-100	95-100	85-95	80-90	45-65	20-35
	5-16	Silty clay, clay, clay loam.	CL, CH	A-7	0-15	95-100	95-100	85-95	80-90	45-65	20-35
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
89, 90, 91------- Mussel	0-8	Loam-------------	CL-ML, ML	A-4	0	80-100	75-100	65-95	60-85	25-35	5-10
	8-42	Loam, sandy clay loam.	CL-ML, ML	A-4	0	90-100	90-100	75-95	55-75	25-35	5-10
	42-60	Stratified gravelly silt loam to loamy sand.	SM, ML, GM	A-4	0	70-100	65-100	55-95	40-75	15-20	NP-5
92--------------- Redrob	0-14	Loam-------------	CL-ML	A-4	0	95-100	95-100	85-95	60-75	20-25	5-10
	14-20	Stratified stony loam to loamy sand.	SM-SC, CL-ML	A-4	0-15	95-100	90-95	65-85	35-60	20-25	5-10
	20-60	Very gravelly sand, very cobbly sand, extremely cobbly loamy sand.	GM, SM, GP-GM, SP-SM	A-1	20-50	40-65	30-60	20-35	5-15	---	NP
93--------------- Rogert	0-6	Very stony sandy loam.	GP-GM, GM, SP-SM, SM	A-1, A-2	30-45	15-70	15-70	10-50	5-30	20-30	NP-5
	6-17	Very gravelly sandy loam, very cobbly sandy loam, extremely gravelly sandy loam.	GM, GP-GM	A-1	10-50	20-50	20-50	15-35	5-20	---	NP
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
94*, 95*:											
Showalter-------	0-8	Very stony loam	GM-GC, GC, SC, SM-SC	A-4, A-6	30-65	65-85	60-80	50-75	40-50	25-35	5-15
	8-39	Very cobbly clay loam, very gravelly clay, very cobbly clay.	GC	A-6, A-7	15-35	55-70	50-65	45-60	35-50	35-50	15-25
	39-60	Very gravelly sandy clay loam, gravelly loam, very cobbly clay loam.	GM-GC, GC, SC, SM-SC	A-4, A-6, A-2	15-30	45-75	40-75	35-65	25-50	25-35	5-15
Morval----------	0-7	Loam-------------	ML, CL-ML	A-4	0-5	90-100	86-96	60-80	50-75	25-30	NP-10
	7-23	Loam, clay loam	SC, CL	A-6	0-10	75-100	70-95	60-85	36-70	30-40	10-25
	23-60	Gravelly clay loam, clay loam, loam.	GC, SC, CL	A-6	0-10	65-90	60-85	40-65	35-55	25-35	10-20
96, 97, 98, 99--- Southace	0-3	Cobbly sandy loam	SM-SC, SM	A-1, A-2	15-30	70-80	65-75	40-50	20-35	20-25	NP-5
	3-14	Gravelly loam----	SM, SM-SC, GM-GC, GM	A-4	5-15	70-80	65-75	50-65	35-45	20-30	NP-10
	14-60	Very gravelly loam, very cobbly loam, very cobbly sandy loam.	GM, SM	A-4, A-2, A-1	10-50	40-80	35-75	25-65	15-45	25-35	NP-10
100*:											
Starley---------	0-8	Very channery loam.	GM-GC, GC	A-2, A-4	0-15	40-55	35-50	30-45	25-40	25-30	5-10
	8-19	Very channery loam, very channery clay loam.	GM-GC, GC	A-2, A-4	0-15	40-55	35-50	30-45	25-40	25-35	5-15
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Starman---------	0-6	Very channery loam.	GM	A-1, A-2	0-15	35-55	30-50	30-45	20-35	30-40	5-10
	6-16	Gravelly loam, channery loam, very channery loam.	GM	A-1, A-2	0-15	35-55	30-50	30-45	20-35	30-40	5-10
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
101*, 102*, 103*:											
Tanna-----------	0-3	Silt loam--------	CL-ML	A-4	0	95-100	95-100	90-100	70-90	20-25	5-10
	3-13	Silty clay loam, clay loam, clay.	CL	A-6, A-7	0	95-100	95-100	90-100	70-95	35-50	15-30
	13-31	Silty clay loam, clay loam, clay.	CL	A-6, A-7	0	95-100	95-100	90-100	70-95	35-50	15-30
	31	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pinelli---------	0-7	Loam-------------	CL-ML	A-4	0	75-100	75-100	65-90	50-75	25-30	5-10
	7-22	Clay loam, silty clay loam, clay.	CL, CH	A-7	0	75-100	75-100	65-90	55-85	45-55	25-35
	22-60	Clay loam, loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	75-100	75-100	65-90	55-85	25-35	5-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
104*:											
Torriorthents---	0-4	Variable---------	ML, SM, CL, SC	A-2, A-4	0-20	65-90	60-85	35-75	25-60	20-35	NP-15
	4-30	Fine sandy loam, loam, clay loam.	SM, CL, CL-ML, SM-SC	A-2, A-4, A-6	0-20	65-95	60-90	50-80	25-70	15-35	NP-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Camborthids-----	0-4	Variable---------	---	---	5-40	---	---	---	---	---	---
	4-30	Loam, clay loam	ML, CL, CL-ML	A-4, A-6	0-5	100	75-100	55-90	50-80	25-40	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
105*:											
Torriorthents---	0-4	Variable---------	ML, SM, CL, SC	A-2, A-4	0-20	65-90	60-85	35-75	25-60	20-35	NP-15
	4-30	Fine sandy loam, loam, clay loam.	SM, CL, CL-ML, SM-SC	A-2, A-4, A-6	0-20	65-95	60-90	50-80	25-70	15-35	NP-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
106*:											
Tridell---------	0-2	Stony sandy loam	CL-ML, SM-SC	A-4, A-2	20-30	75-95	70-90	60-80	30-60	20-30	5-10
	2-37	Very cobbly fine sandy loam, extremely gravelly sandy loam, very stony fine sandy loam.	GM, GM-GC	A-1, A-2	35-50	45-55	40-50	30-40	15-30	15-30	NP-10
	37-60	Very gravelly sand, extremely gravelly sand, extremely cobbly sand.	GP	A-1	30-45	35-45	30-40	20-30	0-5	---	NP
Brownsto--------	0-11	Stony sandy loam	GM-GC, SM-SC	A-4, A-2	30-45	60-70	55-65	45-55	25-45	25-30	5-10
	11-30	Very gravelly sandy loam, very cobbly sandy loam.	GM	A-1	15-35	50-60	45-55	25-35	15-25	---	NP
	30-60	Very gravelly loamy sand, gravelly sandy loam, very gravelly sandy loam.	GM, SM, GP-GM, SP-SM	A-1	10-20	50-65	45-60	25-35	10-20	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
107*, 108*:											
Uracca----------	0-8	Cobbly sandy loam	SM	A-2, A-4	25-35	80-90	75-85	45-60	30-40	20-25	NP-5
	8-15	Very cobbly sandy clay loam, very cobbly clay loam, extremely cobbly loam.	SC, SM-SC, GC, GM-GC	A-2, A-4, A-6	40-75	65-90	50-85	40-70	30-50	25-35	5-15
	15-60	Extremely cobbly loamy sand, extremely cobbly sand.	GM, GP-GM, GP	A-1	50-85	30-50	25-50	20-45	0-15	---	NP
Mergel----------	0-8	Cobbly loam------	CL-ML	A-4	15-30	80-90	75-85	60-80	50-70	20-30	5-10
	8-20	Very cobbly sandy loam, very gravelly sandy loam.	CL-ML, GM-GC, SM-SC	A-2, A-4	30-55	55-90	50-85	45-80	20-60	25-30	5-10
	20-60	Extremely stony sandy clay loam, very cobbly loam, extremely stony sandy loam.	SM-SC, CL-ML	A-2, A-4	45-75	80-90	75-85	55-80	15-70	25-30	5-10
109*, 110*:											
Uracca----------	0-6	Cobbly sandy loam	SM	A-2, A-4	25-35	80-90	75-85	45-60	30-40	20-25	NP-5
	6-12	Very cobbly sandy clay loam, very cobbly clay loam, extremely cobbly loam.	SC, SM-SC, GC, GM-GC	A-2, A-4, A-6	40-75	65-90	50-85	40-70	30-50	25-35	5-15
	12-60	Extremely cobbly loamy sand, extremely cobbly sand.	GM, GP-GM, GP	A-1	50-85	30-50	25-50	20-45	0-15	---	NP
Mergel----------	0-7	Cobbly loam------	CL-ML	A-4	15-30	80-90	75-85	60-80	50-70	20-30	5-10
	7-18	Very cobbly sandy loam, very gravelly sandy loam.	CL-ML, GM-GC, SM-SC	A-2, A-4	30-55	55-90	50-85	45-80	20-60	25-30	5-10
	18-60	Extremely stony sandy clay loam, very cobbly loam, very cobbly sandy loam.	SM-SC, CL-ML	A-2, A-4	45-75	80-90	75-85	55-80	15-70	25-30	5-10
111------------- Vandamore	0-7	Channery sandy loam.	SM, ML	A-4	0-10	55-80	50-75	45-70	40-50	20-25	NP-5
	7-27	Very channery loam, extremely channery loam, very channery fine sandy loam.	GM, GM-GC	A-2, A-1	0-20	25-60	20-55	20-50	15-35	20-30	NP-10
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
112-------------- Woodhall	0-5	Gravelly loam	CL-ML	A-4	15-45	80-90	75-90	70-85	50-70	20-30	5-10
	5-25	Very gravelly loam, very stony clay loam, loam, extremely cobbly clay loam.	ML, GM, SM	A-4	40-60	50-90	50-85	45-80	35-55	30-40	5-10
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
113-------------- Woosley	0-4	Loam-------------	ML	A-4	0	80-90	75-90	70-80	55-70	30-35	5-10
	4-25	Clay loam, silty clay loam.	CL	A-6	0	80-90	75-90	70-90	55-80	35-40	15-20
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
114, 115, 116---- Yamo	0-8	Loam-------------	ML, CL-ML	A-4	0	80-100	75-100	60-90	50-65	15-25	NP-10
	8-14	Loam, clay loam	CL-ML, CL	A-4, A-6	0	80-100	75-100	60-90	50-75	20-30	5-15
	14-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0-5	80-100	75-100	60-90	50-75	20-30	5-15
117*: Yeljack---------	0-10	Silt loam--------	ML	A-4	0	95-100	90-100	80-90	70-90	30-35	5-10
	10-32	Silty clay loam, clay loam.	CL	A-6	0	95-100	90-100	80-90	65-85	30-40	10-20
	32-60	Clay loam--------	CL	A-6	0	95-100	90-100	80-90	65-80	30-40	10-20
Callings--------	0-6	Loam-------------	CL-ML	A-4	0	80-90	75-85	60-75	50-70	20-30	5-10
	6-12	Gravelly loam, gravelly fine sandy loam, cobbly loam.	CL-ML, SM-SC	A-4	15-20	75-85	70-80	55-75	35-70	20-30	5-10
	12-34	Very gravelly clay loam, very cobbly clay, very cobbly clay loam.	GC	A-6, A-7	15-45	50-60	45-55	40-50	35-45	35-50	15-25
	34-60	Extremely cobbly clay loam, cobbly clay loam, very gravelly sandy clay loam.	GC	A-2, A-6	30-65	40-55	35-50	30-45	25-40	30-40	10-15
118-------------- Youga	0-12	Loam-------------	CL-ML, CL	A-4, A-6	0-10	75-95	75-90	70-80	50-60	20-30	5-15
	12-28	Clay loam, sandy clay loam.	CL, SC	A-6	0-25	80-90	75-90	60-75	45-65	25-35	10-20
	28-60	Gravelly sandy clay loam, gravelly clay loam.	SC	A-2, A-6	5-10	75-90	55-75	40-65	25-40	25-35	10-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
119--------------- Zillman	0-5	Very flaggy loam	CL-ML, ML	A-4	10-25	85-95	80-90	55-80	50-75	20-30	NP-10
	5-12	Channery fine sandy loam.	SM	A-1, A-2	5-10	60-80	55-75	40-70	15-35	20-25	NP-5
	12-24	Very channery clay loam, very channery loam.	GC, GM-GC	A-2, A-6, A-4	5-10	35-60	30-55	20-50	15-40	25-40	5-20
	24-60	Very channery clay loam, very channery loam.	GM-GC, GC	A-2, A-4, A-6	5-10	35-60	30-55	20-50	15-40	25-35	5-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
1, 2------------- Acree	0-5	8-17	1.40-1.50	2.0-6.0	0.10-0.14	6.6-7.3	<2	Low--------	0.32	5	3	4-8
	5-10	20-35	1.35-1.40	0.2-0.6	0.13-0.16	6.6-7.3	<2	Moderate	0.28			
	10-60	35-45	1.35-1.45	0.06-0.2	0.13-0.16	7.9-8.4	<2	High------	0.28			
3----------------- Acree	0-10	15-27	1.35-1.40	0.6-2.0	0.17-0.21	6.6-7.8	<2	Low--------	0.28	5	5	2-4
	10-27	35-50	1.35-1.45	0.06-0.2	0.13-0.16	6.6-7.8	<2	High------	0.28			
	27-60	30-45	1.35-1.45	0.06-0.2	0.13-0.16	7.9-8.4	<2	Moderate	0.28			
4, 5------------- Acree	0-10	15-27	1.35-1.40	0.6-2.0	0.17-0.21	6.6-7.8	<2	Low--------	0.28	5	5	2-4
	10-27	35-50	1.35-1.45	0.06-0.2	0.13-0.16	6.6-7.8	<2	High------	0.28			
	27-60	30-45	1.35-1.45	0.06-0.2	0.13-0.16	7.9-8.4	<2	Moderate	0.28			
6, 7------------- Almy	0-8	20-25	1.15-1.25	0.6-2.0	0.17-0.19	7.4-8.4	<4	Low--------	0.32	5	4	1-3
	8-26	20-35	1.25-1.40	0.6-2.0	0.19-0.21	7.4-9.0	<8	Moderate	0.37			
	26-60	10-20	1.35-1.50	2.0-6.0	0.13-0.15	>7.8	<8	Low--------	0.37			
8*, 9*:												
Ansel-----------	0-23	15-25	1.35-1.45	0.6-2.0	0.14-0.16	6.1-7.3	<2	Low--------	0.37	4	5	<1
	23-48	28-35	1.40-1.50	0.2-0.6	0.12-0.16	6.1-7.3	<2	Moderate	0.24			
	48-60	28-35	1.40-1.45	0.2-0.6	0.17-0.20	6.1-7.3	<2	Moderate	0.37			
Anvik-----------	0-12	15-25	1.25-1.30	2.0-6.0	0.16-0.18	6.1-7.3	<2	Low--------	0.28	5	5	2-4
	12-18	10-25	1.40-1.50	0.6-2.0	0.14-0.17	6.1-7.3	<2	Low--------	0.28			
	18-42	20-35	1.25-1.40	0.6-2.0	0.18-0.20	6.1-7.3	<2	Moderate	0.28			
	42-60	20-35	1.25-1.40	0.6-2.0	0.12-0.15	6.1-7.8	<2	Moderate	0.28			
10*, 11*:												
Anvik-----------	0-12	15-25	1.25-1.30	2.0-6.0	0.16-0.18	6.1-7.3	<2	Low--------	0.28	5	5	2-4
	12-18	10-25	1.40-1.50	0.6-2.0	0.14-0.17	6.1-7.3	<2	Low--------	0.28			
	18-42	20-35	1.25-1.40	0.6-2.0	0.18-0.20	6.1-7.3	<2	Moderate	0.28			
	42-60	20-35	1.25-1.40	0.6-2.0	0.12-0.15	6.1-7.8	<2	Moderate	0.28			
Skylick---------	0-31	10-25	1.25-1.35	0.6-2.0	0.14-0.16	6.1-7.3	<2	Low--------	0.17	5	5	2-5
	31-48	20-35	1.20-1.30	0.2-0.6	0.17-0.20	6.1-7.3	<2	Moderate	0.32			
	48-60	20-35	1.25-1.35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Moderate	0.28			
Sligting--------	0-24	20-27	1.35-1.40	0.6-2.0	0.09-0.12	6.6-7.3	<2	Low--------	0.10	3	8	4-6
	24-60	35-45	1.15-1.20	0.06-0.2	0.07-0.11	5.6-6.5	<2	Moderate	0.10			
12*:												
Arle------------	0-10	15-25	1.35-1.45	0.6-2.0	0.07-0.09	7.4-8.4	<2	Low--------	0.10	2	8	2-4
	10-30	10-25	1.40-1.50	0.6-2.0	0.06-0.09	7.9-8.4	<2	Low--------	0.10			
	30	---	---	---	---	---	---	-----------	----			
Ansari----------	0-8	18-25	1.35-1.45	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low--------	0.24	1	4	2-4
	8-14	16-20	1.35-1.45	0.6-2.0	0.08-0.12	7.9-8.4	<2	Low--------	0.15			
	14	---	---	---	---	---	---	-----------	----			
Rock outcrop.												
13*:												
Atencio---------	0-10	10-20	1.45-1.55	2.0-6.0	0.12-0.14	7.4-7.8	<2	Low--------	0.17	3	3	2-4
	10-24	18-35	1.40-1.50	0.6-2.0	0.11-0.13	7.4-7.8	<2	Moderate	0.20			
	24-30	15-25	1.40-1.55	2.0-6.0	0.07-0.09	7.9-8.4	<2	Low--------	0.15			
	30-60	0-2	1.60-1.70	6.0-20	0.03-0.05	7.9-8.4	<2	Low--------	0.10			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
13*:												
Azeltine--------	0-9	10-20	1.45-1.55	2.0-6.0	0.09-0.12	7.4-8.4	<2	Low-------	0.15	2	6	2-4
	9-16	18-25	1.40-1.50	0.6-2.0	0.10-0.13	7.4-8.4	<2	Low-------	0.20			
	16-60	0-2	1.65-1.75	>6.0	0.03-0.05	7.4-8.4	<2	Low-------	0.10			
14*:												
Callings--------	0-5	14-18	0.94-0.98	0.6-2.0	0.13-0.15	6.1-7.8	<2	Low-------	0.24	2	5	4-6
	5-11	10-15	1.00-1.02	0.6-2.0	0.08-0.10	6.1-7.8	<2	Low-------	0.17			
	11-33	35-45	1.05-1.07	0.06-0.2	0.09-0.11	6.1-7.8	<2	Moderate	0.15			
	33-60	25-30	1.10-1.15	0.2-0.6	0.07-0.09	6.6-7.8	<2	Low-------	0.15			
Yeljack---------	0-9	15-20	1.15-1.25	0.6-2.0	0.17-0.19	6.1-7.3	<2	Low-------	0.37	5	6	2-5
	9-31	27-30	1.20-1.30	0.2-0.6	0.18-0.20	6.1-7.3	<2	Moderate	0.32			
	31-60	30-35	1.20-1.30	0.2-0.6	0.18-0.20	6.1-7.3	<2	Moderate	0.32			
15*, 16*:												
Charcol---------	0-20	10-20	1.35-1.40	2.0-6.0	0.06-0.09	5.6-6.0	<2	Low-------	0.10	5	8	2-4
	20-46	10-20	1.35-1.40	0.6-2.0	0.08-0.11	5.6-6.0	<2	Low-------	0.05			
	46-60	20-35	1.40-1.45	0.6-2.0	0.08-0.11	5.6-6.0	<2	Low-------	0.05			
Mord------------	0-10	10-20	1.35-1.45	2.0-6.0	0.14-0.17	6.1-7.8	<2	Low-------	0.24	5	3	3-5
	10-21	25-35	1.45-1.55	0.2-0.6	0.19-0.21	6.1-7.8	<2	Moderate	0.24			
	21-40	40-55	1.40-1.50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High------	0.24			
	40-60	35-45	1.30-1.40	0.2-0.6	0.16-0.18	6.1-7.8	<2	High------	0.24			
17*, 18*, 19*:												
Cochetopa-------	0-3	20-27	1.35-1.45	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low-------	0.24	5	6	3-6
	3-38	35-55	1.35-1.45	0.06-0.2	0.11-0.14	6.6-7.8	<2	High------	0.24			
	38-60	35-50	1.40-1.50	0.06-0.2	0.10-0.13	6.1-7.8	<2	High------	0.24			
Antrobus--------	0-13	15-27	1.35-1.45	0.6-2.0	0.09-0.12	7.9-8.4	<2	Low-------	0.05	5	8	2-4
	13-60	20-35	1.40-1.50	0.6-2.0	0.05-0.07	7.9-8.4	<2	Low-------	0.10			
20--------------- Coulterg	0-14	20-27	1.40-1.45	0.6-2.0	0.16-0.20	7.4-8.4	<2	Low-------	0.28	5	5	4-6
	14-60	18-30	1.40-1.50	0.6-2.0	0.16-0.20	7.4-8.4	<4	Low-------	0.28			
21*, 22*:												
Curecanti-------	0-10	10-20	1.40-1.50	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low-------	0.10	5	8	2-4
	10-60	18-35	1.40-1.50	0.6-2.0	0.06-0.10	6.1-7.3	<2	Low-------	0.20			
Fughes----------	0-10	20-27	1.25-1.35	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low-------	0.17	5	8	2-4
	10-46	35-50	1.20-1.30	0.06-0.2	0.16-0.18	6.6-7.8	<2	High------	0.32			
	46-60	27-40	1.25-1.35	0.2-0.6	0.17-0.19	6.6-7.8	<2	Moderate	0.32			
23, 24----------- Cushool	0-7	10-20	1.40-1.45	2.0-6.0	0.10-0.13	7.9-8.4	2-4	Low-------	0.24	2	3	1-3
	7-26	18-25	1.40-1.45	0.6-2.0	0.10-0.12	7.9-8.4	2-4	Low-------	0.24			
	26-35	5-15	1.50-1.55	2.0-6.0	0.04-0.06	7.9-8.4	2-4	Low-------	0.05			
	35	---	---	---	---	---	---	----------	----			
25*:												
Cushool---------	0-11	10-25	1.35-1.40	0.6-2.0	0.12-0.14	7.9-8.4	2-4	Low-------	0.28	2	5	1-3
	11-26	18-25	1.40-1.45	0.6-2.0	0.10-0.12	7.9-8.4	2-4	Low-------	0.24			
	26-35	5-15	1.50-1.55	2.0-6.0	0.04-0.06	7.9-8.4	2-4	Low-------	0.05			
	35	---	---	---	---	---	---	----------	----			
Rentsac---------	0-6	7-18	1.30-1.50	2.0-6.0	0.12-0.16	6.6-8.4	<2	Low-------	0.20	1	5	.5-2
	6-18	7-18	1.50-1.75	2.0-6.0	0.07-0.09	7.4-8.4	<4	Low-------	0.10			
	18	---	---	---	---	---	---	----------	----			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
26*, 27*, 28*:												
Dahlquist-------	0-6	12-20	1.25-1.35	2.0-6.0	0.06-0.10	6.6-7.8	<2	Low--------	0.05	5	8	1-3
	6-13	20-35	1.25-1.40	0.6-2.0	0.06-0.11	6.6-7.8	<2	Low--------	0.02			
	13-60	7-20	1.25-1.45	>6.0	0.03-0.05	7.9-9.0	<2	Low--------	0.02			
Southace--------	0-10	5-20	1.40-1.50	2.0-6.0	0.08-0.10	7.9-8.4	<2	Low--------	0.10	2	3	1-3
	10-22	5-20	1.45-1.55	2.0-6.0	0.04-0.06	7.9-8.4	<2	Low--------	0.02			
	22-60	2-15	1.60-1.70	>20	0.02-0.04	7.9-8.4	<2	Low--------	0.02			
29*, 30*:												
Dollard---------	0-4	35-40	1.20-1.30	0.06-0.2	0.17-0.19	7.4-8.4	<2	High------	0.37	2	4L	1-2
	4-33	35-50	1.30-1.40	0.06-0.2	0.13-0.18	7.9-9.0	<2	High------	0.37			
	33	---	---	---	---	---	---	----------	----			
Rock outcrop.												
31--------------- Dotsero	0-31	10-18	1.30-1.40	2.0-6.0	0.08-0.10	6.6-8.4	<2	Low--------	0.10	5	5	3-6
	31-41	10-18	1.40-1.50	2.0-6.0	0.07-0.09	7.9-8.4	<2	Low--------	0.20			
	41-60	15-25	1.40-1.50	2.0-6.0	0.11-0.18	7.9-8.4	<2	Low--------	0.24			
32--------------- Dotsero	0-7	10-18	1.30-1.40	2.0-6.0	0.10-0.14	6.6-8.4	<2	Low--------	0.20	5	5	3-6
	7-41	10-18	1.40-1.50	2.0-6.0	0.07-0.09	7.9-8.4	<2	Low--------	0.20			
	41-60	15-25	1.40-1.50	2.0-6.0	0.11-0.18	7.9-8.4	<2	Low--------	0.24			
33*:												
Earsman---------	0-5	10-20	1.40-1.55	2.0-6.0	0.06-0.09	7.4-8.4	<2	Low--------	0.17	1	5	<1
	5-19	5-18	1.40-1.55	2.0-6.0	0.04-0.09	7.4-9.0	<4	Low--------	0.10			
	19	---	---	---	---	---	---	----------	----			
Rock outcrop.												
34, 35, 36------- Empedrado	0-5	15-27	1.35-1.45	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low--------	0.24	5	5	2-4
	5-40	20-35	1.40-1.55	0.6-2.0	0.19-0.21	6.6-7.8	<2	Moderate	0.24			
	40-60	15-30	1.40-1.55	2.0-6.0	0.11-0.13	7.9-8.4	<2	Low--------	0.17			
37--------------- Etoe	0-8	10-23	1.35-1.45	0.6-2.0	0.16-0.18	6.1-7.3	<2	Low--------	0.37	5	5	1-3
	8-24	10-20	1.40-1.50	0.6-2.0	0.10-0.14	6.1-6.5	<2	Low--------	0.15			
	24-60	20-25	1.45-1.55	0.6-2.0	0.05-0.11	6.1-7.3	<2	Low--------	0.15			
38, 39----------- Evanston	0-14	15-27	1.25-1.35	0.6-2.0	0.15-0.18	6.1-7.8	<2	Low--------	0.28	5	5	2-4
	14-31	18-35	1.35-1.45	0.6-2.0	0.16-0.20	6.6-8.4	<2	Moderate	0.37			
	31-60	18-27	1.35-1.45	0.6-2.0	0.16-0.18	7.9-9.0	<2	Low--------	0.37			
40, 41----------- Evanston	0-12	15-27	1.25-1.35	0.6-2.0	0.15-0.18	6.1-7.8	<2	Low--------	0.28	5	5	2-4
	12-25	18-35	1.35-1.45	0.6-2.0	0.16-0.20	6.6-8.4	<2	Moderate	0.37			
	25-60	18-27	1.35-1.45	0.6-2.0	0.16-0.18	7.9-9.0	<2	Low--------	0.37			
42*-------------- Fluvaquents	0-10	4-30	1.20-1.50	0.6-20	0.07-0.16	7.4-8.4	<8	Low--------	0.20	5	3	<1
	10-24	10-35	1.40-1.60	0.6-2.0	0.10-0.18	7.4-8.4	<8	Low--------	0.28			
	24-60	0-5	1.60-1.70	>20	0.04-0.09	7.4-8.4	<2	Low--------	0.05			
43*, 44*:												
Forelle---------	0-6	15-27	1.15-1.25	0.6-2.0	0.16-0.18	6.6-8.4	<2	Low--------	0.32	5	5	.5-1
	6-30	18-35	1.25-1.35	0.6-2.0	0.16-0.21	6.6-8.4	<2	Moderate	0.37			
	30-60	18-30	1.25-1.35	0.6-2.0	0.16-0.18	7.9-9.0	<2	Low--------	0.37			
Brownsto--------	0-4	10-20	1.35-1.45	2.0-6.0	0.08-0.10	7.4-8.4	<2	Low--------	0.10	5	3	1-2
	4-11	15-20	1.25-1.35	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low--------	0.20			
	11-30	15-20	1.35-1.45	2.0-6.0	0.06-0.08	7.4-8.4	<2	Low--------	0.05			
	30-60	5-15	1.35-1.45	2.0-6.0	0.05-0.10	7.4-8.4	<2	Low--------	0.10			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
45, 46, 47-------Forsey	0-10	15-25	1.25-1.35	0.6-2.0	0.10-0.13	6.6-7.8	<2	Low--------	0.17	5	8	2-4
	10-22	20-35	1.25-1.35	0.6-2.0	0.07-0.12	6.6-7.8	<2	Low--------	0.10			
	22-60	10-25	1.35-1.45	0.6-2.0	0.06-0.10	7.9-8.4	<2	Low--------	0.10			
48---------------Fughes	0-6	20-27	1.25-1.35	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low--------	0.17	5	8	2-4
	6-50	35-50	1.20-1.30	0.06-0.2	0.16-0.18	6.6-7.8	<2	High-------	0.32			
	50-60	27-40	1.25-1.35	0.2-0.6	0.17-0.19	6.6-7.8	<2	Moderate	0.32			
49, 50-----------Goslin	0-5	8-18	1.25-1.35	2.0-6.0	0.11-0.15	7.9-9.0	<4	Low--------	0.32	5	3	<2
	5-60	8-18	1.35-1.45	2.0-6.0	0.11-0.15	7.9-9.0	<4	Low--------	0.32			
51, 52, 53-------Gothic	0-12	20-27	1.35-1.45	0.6-2.0	0.14-0.18	6.6-7.8	<2	Low--------	0.24	5	5	2-4
	12-34	35-50	1.40-1.50	0.06-0.2	0.14-0.16	6.6-7.8	<2	High-------	0.10			
	34-60	35-40	1.40-1.50	0.06-0.2	0.14-0.16	6.6-8.4	<2	High-------	0.10			
54---------------Grotte	0-4	15-25	1.35-1.45	0.6-2.0	0.12-0.15	7.4-8.4	<2	Low--------	0.10	5	6	1-3
	4-7	25-35	1.30-1.40	0.6-2.0	0.12-0.15	7.4-8.4	<2	Low--------	0.10			
	7-60	25-35	1.30-1.40	0.2-0.6	0.09-0.13	7.9-8.4	<2	Low--------	0.10			
55*:												
Gypsum land.												
Gypsiorthids----	0-8	10-20	1.35-1.50	0.6-2.0	0.14-0.18	7.4-8.4	2-8	Low--------	0.37	2	4L	<1
	8-23	10-20	1.40-1.50	0.6-2.0	0.14-0.18	7.4-8.4	4-8	Low--------	0.37			
	23-39	10-20	1.40-1.50	0.6-2.0	0.14-0.18	7.4-8.4	4-8	Low--------	0.37			
	39	---	---	---	---	---	---	-----------	----			
56, 57-----------Ipson	0-14	20-25	1.25-1.30	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low--------	0.10	5	8	1-3
	14-26	27-35	1.25-1.35	0.6-2.0	0.09-0.11	7.4-7.8	<2	Moderate	0.10			
	26-60	25-30	1.30-1.40	0.6-2.0	0.08-0.10	7.9-8.4	<2	Moderate	0.10			
58---------------Irrawaddy	0-5	12-25	1.25-1.35	0.6-2.0	0.10-0.13	7.4-8.4	<2	Low--------	0.10	3	8	2-5
	5-14	12-25	1.30-1.40	0.6-2.0	0.09-0.10	7.4-8.4	<2	Low--------	0.17			
	14-34	12-25	1.30-1.40	0.6-2.0	0.08-0.10	7.4-8.4	<2	Low--------	0.15			
	34	---	---	---	---	---	---	-----------	----			
59, 60-----------Iyers	0-3	20-27	1.40-1.45	0.6-2.0	0.14-0.18	7.4-8.4	<2	Low--------	0.32	2	5	<1
	3-37	35-55	1.35-1.45	0.06-0.2	0.14-0.16	7.4-8.4	<2	High-------	0.32			
	37	---	---	---	---	---	---	-----------	----			
61, 62-----------Iyers	0-6	28-35	1.30-1.40	0.2-0.6	0.12-0.16	7.4-8.4	<2	Moderate	0.28	2	4	<1
	6-33	35-55	1.35-1.45	0.06-0.2	0.14-0.16	7.4-8.4	<2	High-------	0.32			
	33	---	---	---	---	---	---	-----------	----			
63, 64-----------Jerry	0-11	15-35	1.35-1.45	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.24	5	6	3-5
	11-34	20-40	1.40-1.50	0.6-2.0	0.13-0.15	6.6-8.4	<2	Moderate	0.24			
	34-60	15-22	1.40-1.50	0.6-2.0	0.10-0.12	7.4-8.4	<2	Low--------	0.17			
65*, 66*, 67*:												
Jerry-----------	0-11	15-35	1.35-1.45	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.24	5	6	3-5
	11-34	20-40	1.40-1.50	0.6-2.0	0.13-0.15	6.6-8.4	<2	Moderate	0.24			
	34-60	15-22	1.40-1.50	0.6-2.0	0.10-0.12	7.4-8.4	<2	Low--------	0.17			
Millerlake------	0-19	15-27	1.25-1.35	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.24	5	5	2-5
	19-44	20-35	1.25-1.35	0.2-0.6	0.19-0.21	6.6-7.8	<2	Moderate	0.32			
	44-60	18-27	1.25-1.35	0.6-2.0	0.10-0.12	7.9-8.4	<2	Low--------	0.10			
68---------------Jodero	0-15	18-27	1.25-1.30	0.6-2.0	0.16-0.18	6.1-7.3	<2	Low--------	0.28	5	5	2-5
	15-60	18-25	1.30-1.40	0.6-2.0	0.13-0.15	6.6-8.4	<2	Low--------	0.24			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
69---------------- Kilgore	0-4	24-27	1.15-1.20	0.2-0.6	0.15-0.20	6.1-7.8	<2	Moderate	0.28	3	7	6-10
	4-25	18-35	1.15-1.25	0.2-0.6	0.17-0.21	6.1-7.8	<2	Moderate	0.28			
	25-29	12-16	1.50-1.55	2.0-6.0	0.06-0.08	6.1-7.8	<2	Low--------	0.05			
	29-60	2-8	1.60-1.70	>20.0	0.03-0.05	6.1-7.8	<2	Low--------	0.02			
70, 71, 72, 73--- Kobar	0-3	35-40	1.15-1.30	0.2-0.6	0.17-0.21	7.4-8.4	<2	Moderate	0.37	5	7	<1
	3-35	35-45	1.15-1.30	0.06-0.2	0.15-0.19	7.4-8.4	<2	High-------	0.37			
	35-60	35-45	1.15-1.30	0.06-0.2	0.15-0.19	7.9-8.4	<2	High-------	0.37			
74---------------- Leavittville	0-32	15-25	1.30-1.35	0.6-2.0	0.16-0.19	6.6-8.4	<2	Low--------	0.24	5	4	2-4
	32-50	20-35	1.35-1.40	0.6-2.0	0.12-0.15	7.9-8.4	<2	Low--------	0.24			
	50	---	---	---	---	---	---	-----------	----			
75---------------- Millerlake	0-19	15-27	1.25-1.35	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.24	5	5	2-5
	19-44	20-35	1.25-1.35	0.2-0.6	0.19-0.21	6.6-8.4	<2	Moderate	0.32			
	44-60	18-27	1.25-1.35	0.6-2.0	0.10-0.12	7.9-8.4	<2	Low--------	0.10			
76, 77------------ Mine	0-4	15-25	1.30-1.40	0.6-2.0	0.14-0.18	5.1-6.5	<2	Low--------	0.24	5	5	1-2
	4-37	5-18	1.55-1.65	6.0-20	0.06-0.09	5.1-6.5	<2	Low--------	0.10			
	37-60	5-18	1.55-1.65	>6.0	0.03-0.07	5.1-6.5	<2	Low--------	0.05			
78---------------- Miracle	0-3	15-25	1.30-1.40	0.6-2.0	0.14-0.16	6.6-7.8	<2	Low--------	0.24	5	6	2-3
	3-18	18-35	1.40-1.45	0.6-2.0	0.14-0.16	6.6-7.8	<2	Low--------	0.28			
	18-37	10-25	1.50-1.55	2.0-6.0	0.10-0.13	7.4-8.4	<2	Low--------	0.28			
	37	---	---	---	---	---	---	-----------	----			
79, 80, 81-------- Moen	0-4	10-15	1.30-1.40	0.6-2.0	0.15-0.18	6.1-7.8	<2	Low--------	0.20	2	5	2-4
	4-22	20-35	1.35-1.45	0.2-0.6	0.18-0.20	6.6-7.8	<2	Moderate	0.24			
	22	---	---	---	---	---	---	-----------	----			
82, 83------------ Monad	0-2	10-20	1.15-1.35	2.0-6.0	0.11-0.13	5.6-7.3	<2	Low--------	0.24	5	3	2-4
	2-37	22-35	1.40-1.60	0.2-0.6	0.14-0.17	5.6-7.3	<2	Moderate	0.37			
	37-60	27-35	1.40-1.60	0.2-0.6	0.11-0.13	6.6-7.8	<2	Moderate	0.20			
84, 85, 86-------- Morval	0-7	15-27	1.30-1.40	0.6-2.0	0.14-0.17	7.4-8.4	<2	Low--------	0.37	5	4	1-2
	7-23	25-35	1.40-1.50	0.6-2.0	0.14-0.21	7.4-8.4	<4	Moderate	0.37			
	23-60	25-35	1.40-1.50	0.6-2.0	0.08-0.18	7.4-8.4	<4	Moderate	0.28			
87*:												
Morval-----------	0-7	15-27	1.30-1.40	0.6-2.0	0/34-0.17	7.4-8.4	<2	Low--------	0.37	5	4	1-2
	7-23	25-35	1.40-1.50	0.6-2.0	0.14-0.21	7.4-8.4	<4	Moderate	0.37			
	23-60	25-35	1.40-1.50	0.6-2.0	0.08-0.18	7.4-8.4	<4	Moderate	0.28			
Tridell----------	0-2	10-15	1.25-1.35	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low--------	0.15	3	8	1-4
	2-37	5-15	1.35-1.55	2.0-6.0	0.06-0.10	7.9-9.0	<2	Low--------	0.10			
	37-60	0-5	1.35-1.55	6.0-20	0.06-0.10	>8.4	<2	Low--------	0.02			
88*:												
Moyerson---------	0-5	40-50	1.25-1.30	0.06-0.2	0.14-0.17	7.4-9.0	2-4	High-------	0.28	2	4	1-2
	5-16	35-50	1.25-1.30	0.06-0.2	0.14-0.17	7.4-9.0	2-4	High-------	0.28			
	16	---	---	---	---	---	---	-----------	----			
Rock outcrop.												
89, 90, 91-------- Mussel	0-8	18-27	1.10-1.30	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low--------	0.32	5	4L	1-4
	8-42	18-30	1.40-1.60	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low--------	0.37			
	42-60	10-25	1.35-1.60	0.6-2.0	0.12-0.14	7.9-8.4	<4	Low--------	0.24			
92---------------- Redrob	0-14	18-27	1.25-1.30	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low--------	0.32	5	5	2-4
	14-20	18-27	1.35-1.40	2.0-6.0	0.12-0.15	7.4-8.4	<2	Low--------	0.32			
	20-60	2-8	1.55-1.65	>20	0.03-0.05	6.6-7.8	<2	Low--------	0.10			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
93---------------- Rogert	0-6	5-15	1.30-1.40	2.0-6.0	0.05-0.07	6.1-7.8	<2	Low--------	0.10	1	8	2-4
	6-17	5-18	1.40-1.50	>6.0	0.05-0.07	6.1-7.8	<2	Low--------	0.05			
	17	---	---	---	---	---	---	-----------	----			
94*, 95*:												
Showalter-------	0-8	20-25	1.30-1.35	0.6-2.0	0.08-0.12	6.6-7.8	<2	Low--------	0.10	3	8	2-3
	8-39	35-45	1.15-1.20	0.06-0.2	0.10-0.12	6.6-7.8	<2	Moderate	0.05			
	39-60	20-30	1.25-1.30	0.6-2.0	0.08-0.13	7.4-8.4	<2	Low--------	0.15			
Morval----------	0-7	15-27	1.30-1.40	0.6-2.0	0.14-0.17	7.4-8.4	<2	Low--------	0.37	5	4	1-2
	7-23	25-35	1.40-1.50	0.6-2.0	0.14-0.21	7.4-8.4	<4	Moderate	0.37			
	23-60	25-35	1.40-1.50	0.6-2.0	0.08-0.18	7.4-8.4	<4	Moderate	0.28			
96, 97, 98, 99--- Southace	0-3	10-20	1.25-1.35	2.0-6.0	0.07-0.10	7.4-8.4	<2	Low--------	0.10	5	3	1-3
	3-14	15-25	1.45-1.55	0.6-2.0	0.09-0.12	7.4-8.4	<2	Low--------	0.10			
	14-60	10-27	1.40-1.50	2.0-6.0	0.03-0.7	7.9-9.0	<2	Low--------	0.10			
100*:												
Starley---------	0-8	18-27	1.25-1.35	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low--------	0.05	1	8	2-4
	8-19	18-35	1.25-1.35	0.6-2.0	0.08-0.10	7.4-8.4	<2	Low--------	0.10			
	19	---	---	---	---	---	---	-----------	----			
Starman---------	0-6	15-23	1.25-1.35	0.6-2.0	0.09-0.11	7.4-9.0	<2	Low--------	0.05	1	7	1-2
	6-16	20-27	1.35-1.45	0.6-2.0	0.09-0.11	7.4-9.0	<2	Low--------	0.05			
	16	---	---	---	---	---	---	-----------	----			
101*, 102*, 103*:												
Tanna-----------	0-3	20-27	1.15-1.25	0.2-0.6	0.16-0.18	6.6-7.8	<2	Low--------	0.28	2	6	2-4
	3-13	35-45	1.20-1.30	0.06-0.2	0.15-0.17	6.6-7.8	<2	High-------	0.32			
	13-31	35-45	1.20-1.30	0.06-0.2	0.15-0.17	7.4-8.4	<2	High-------	0.37			
	31	---	---	---	---	---	---	-----------	----			
Pinelli---------	0-7	18-27	1.15-1.25	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.32	5	6	1-2
	7-22	35-50	1.15-1.30	0.2-0.6	0.19-0.21	6.6-8.4	<2	Moderate	0.37			
	22-60	18-35	1.20-1.35	0.2-0.6	0.19-0.21	7.9-9.0	<4	Moderate	0.37			
104*:												
Torriorthents---	0-4	10-30	1.20-1.30	0.6-2.0	0.06-0.10	6.1-8.4	<2	-----------	0.28	1	7	<1
	4-30	5-35	1.30-1.50	0.6-2.0	0.10-0.18	6.1-8.4	<2	Low--------	0.32			
	30	---	---	---	---	---	---	-----------	----			
Camborthids-----	0-4	---	---	---	---	6.1-8.4	<2	-----------	----	---	---	<1
	4-30	20-35	1.40-1.50	0.6-2.0	0.12-0.16	6.1-8.4	<2	Moderate	0.28			
	30	---	---	---	---	---	---	-----------	----			
Rock outcrop.												
105*:												
Torriorthents---	0-4	10-30	1.20-1.30	0.6-2.0	0.06-0.10	6.1-8.4	<2	-----------	0.28	1	7	<1
	4-30	5-35	1.30-1.50	0.6-2.0	0.10-0.18	6.1-8.4	<2	Low--------	0.32			
	30	---	---	---	---	---	---	-----------	----			
Rock outcrop.												
106*:												
Tridell---------	0-2	10-15	1.25-1.35	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low--------	0.15	3	8	1-4
	2-37	5-15	1.35-1.55	2.0-6.0	0.06-0.10	7.9-9.0	<2	Low--------	0.10			
	37-60	0-5	1.35-1.55	6.0-20	0.06-0.10	7.9-9.0	<2	Low--------	0.02			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Wind erodi- bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm					Pct
106*:												
Brownsto--------	0-11	15-20	1.25-1.30	0.6-2.0	0.09-0.10	7.9-8.4	<2	Low--------	0.15	3	8	1-2
	11-30	15-20	1.25-1.30	0.6-2.0	0.11-0.12	7.9-8.4	<2	Low--------	0.10			
	30-60	5-10	1.45-1.55	2.0-6.0	0.04-0.09	7.9-9.0	<2	Low--------	0.05			
107*, 108*:												
Uracca----------	0-8	5-15	1.40-1.50	2.0-6.0	0.08-0.11	6.6-7.8	<2	Low--------	0.10	2	5	1-3
	8-15	18-35	1.30-1.40	2.0-6.0	0.06-0.08	6.6-8.4	<2	Low--------	0.17			
	15-60	0-5	1.55-1.65	6.0-20	0.04-0.05	7.4-8.4	<2	Low--------	0.10			
Mergel----------	0-8	10-25	1.30-1.35	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low--------	0.15	4	4L	2-4
	8-20	18-25	1.35-1.45	0.6-2.0	0.06-0.08	7.9-8.4	<2	Low--------	0.10			
	20-60	18-25	1.35-1.50	0.6-2.0	0.04-0.06	7.9-8.4	<2	Low--------	0.05			
109*, 110*:												
Uracca----------	0-6	5-15	1.40-1.50	2.0-6.0	0.08-0.11	6.6-7.8	<2	Low--------	0.10	2	5	1-3
	6-12	18-35	1.30-1.40	2.0-6.0	0.06-0.08	6.6-8.4	<2	Low--------	0.17			
	12-60	0-5	1.55-1.65	6.0-20	0.04-0.05	7.4-8.4	<2	Low--------	0.10			
Mergel----------	0-7	10-25	1.30-1.35	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low--------	0.15	4	4L	2-4
	7-18	18-25	1.35-1.45	0.6-2.0	0.06-0.08	7.9-8.4	<2	Low--------	0.10			
	18-60	18-25	1.35-1.50	0.6-2.0	0.04-0.06	7.9-8.4	<2	Low--------	0.05			
111-------------- Vandamore	0-7	10-15	1.40-1.45	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low--------	0.10	1	8	1-2
	7-27	6-25	1.35-1.45	2.0-6.0	0.06-0.08	7.4-8.4	<2	Low--------	0.20			
	27	---	---	---	---	---	---	----------	----			
112-------------- Woodhall	0-5	15-25	1.25-1.35	0.6-2.0	0.10-0.14	6.1-7.3	<2	Low--------	0.17	2	8	2-4
	5-25	20-35	1.35-1.45	0.6-2.0	0.10-0.14	6.1-7.3	<2	Low--------	0.20			
	25	---	---	---	---	---	---	----------	----			
113-------------- Woosley	0-4	18-25	1.05-1.25	0.6-2.0	0.16-0.18	6.1-7.8	<2	Low--------	0.37	2	6	2-3
	4-25	28-35	1.15-1.35	0.6-2.0	0.19-0.21	6.6-7.8	<2	Moderate	0.43			
	25	---	---	---	---	---	---	----------	----			
114, 115, 116---- Yamo	0-8	15-25	1.35-1.40	0.6-2.0	0.13-0.17	7.4-8.4	<2	Low--------	0.28	5	5	<1
	8-14	20-30	1.35-1.40	0.6-2.0	0.13-0.17	7.4-8.4	<2	Low--------	0.28			
	14-60	20-30	1.40-1.45	0.6-2.0	0.13-0.17	7.9-8.4	<2	Low--------	0.28			
117*:												
Yeljack---------	0-10	15-20	1.15-1.25	0.6-2.0	0.17-0.19	6.1-7.3	<2	Low--------	0.37	5	6	2-5
	10-32	27-30	1.20-1.30	0.2-0.6	0.18-0.20	6.1-7.3	<2	Moderate	0.32			
	32-60	30-35	1.20-1.30	0.2-0.6	0.18-0.20	6.1-7.3	<2	Moderate	0.32			
Callings--------	0-6	14-18	0.94-0.98	0.6-2.0	0.13-0.15	6.1-7.8	<2	Low--------	0.24	2	5	4-6
	6-12	10-15	1.00-1.02	0.6-2.0	0.08-0.10	6.1-7.8	<2	Low--------	0.17			
	12-34	35-45	1.05-1.07	0.06-0.2	0.09-0.11	6.1-7.8	<2	Moderate	0.15			
	34-60	25-30	1.10-1.15	0.2-0.6	0.07-0.09	6.6-7.8	<2	Low--------	0.15			
118-------------- Youga	0-12	15-27	1.35-1.45	0.6-2.0	0.06-0.18	6.1-7.8	<2	Low--------	0.24	5	5	2-5
	12-28	20-35	1.35-1.45	0.6-2.0	0.12-0.18	6.1-7.8	<2	Moderate	0.20			
	28-60	20-35	1.35-1.45	0.6-2.0	0.12-0.14	6.1-7.8	<2	Moderate	0.17			
119-------------- Zillman	0-5	10-25	1.35-1.40	0.6-2.0	0.12-0.14	7.4-7.8	<2	Low--------	0.10	4	5	1-3
	5-12	5-18	1.45-1.50	2.0-6.0	0.10-0.12	7.4-7.8	<2	Low--------	0.10			
	12-24	20-35	1.35-1.40	0.6-2.0	0.08-0.10	7.4-7.8	<2	Low--------	0.05			
	24-60	18-30	1.35-1.40	0.6-2.0	0.08-0.10	7.9-8.4	<2	Low--------	0.05			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness		Uncoated steel	Concrete
					Ft			In				
1, 2: Acree	C	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
3, 4, 5: Acree	C	None	---	---	>6.0	---	---	>60	---	Low	High	Moderate.
6, 7: Almy	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
8*, 9*:												
Ansel	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
Anvik	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
10*, 11*:												
Anvik	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
Skylick	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
Sligting	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
12*:												
Arle	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Low.
Ansari	D	None	---	---	>6.0	---	---	10-20	Hard	Low	High	Low.
Rock outcrop.												
13*:												
Atencio	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
Azeltine	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
14*:												
Callings	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
Yeljack	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
15*, 16*:												
Charcol	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate	Moderate.
Mord	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
17*, 18*, 19*:												
Cochetopa	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
Antrobus	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
20 Coulterg	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	High.
21*, 22*:												
Curecanti	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
Fughes	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
23, 24 Cushool	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.
25*:												
Cushool	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Moderate.
Rentsac	D	None	---	---	>6.0	---	---	8-20	Hard	Moderate	High	Low.
26*, 27*, 28*:												
Dahlquist	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
Southace	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
29*, 30*:												
Dollard	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High	Low.
Rock outcrop.												
31, 32 Dotsero	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
33*:												
Earsman	D	None	---	---	>6.0	---	---	10-20	Hard	Low	High	Low.
Rock outcrop.												
34, 35, 36 Empedrado	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
37 Etoe	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
38, 39, 40, 41 Evanston	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
42*: Fluvaquents	D	Occasional	Brief	Mar-Sep	0.6-2.0	Apparent	Mar-Sep	>60	---	High	High	Low.
43*, 44*:												
Forelle	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
Brownsto	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
45, 46, 47: Forsey	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
48: Fughes	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
49, 50: Goslin	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
51, 52, 53: Gothic	C	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
54: Grotte	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
55*:												
Gypsum land.												
Gypsiorthids	D	None	---	---	>6.0	---	---	10-40	Soft	Low	High	High.
56, 57: Ipson	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
58: Irrawaddy	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High	Low.
59, 60, 61, 62: Iyers	D	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate	Low.
63, 64: Jerry	C	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
65*, 66*, 67*:												
Jerry	C	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Millerlake	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
68: Jodero	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
69----------------- Kilgore	D	Occasional	Very brief	May-Sep	1.0-3.0	Apparent	Jan-Dec	>60	---	High--------	Moderate	Low.
70, 71, 72, 73----- Kobar	C	None----------	---	---	>6.0	---	---	>60	---	Low---------	High------	High.
74----------------- Leavittville	B	None----------	---	---	>6.0	---	---	40-60	Soft	Low---------	High------	Low.
75----------------- Millerlake	B	None----------	---	---	>6.0	---	---	>60	---	Moderate----	High------	Low.
76, 77------------- Mine	B	None----------	---	---	>6.0	---	---	>60	---	Moderate----	Low-------	Moderate.
78----------------- Miracle	C	None----------	---	---	>6.0	---	---	20-40	Hard	Moderate----	High------	Low.
79, 80, 81--------- Moen	C	None----------	---	---	>6.0	---	---	20-40	Hard	Moderate----	Moderate	Low.
82, 83------------- Monad	B	None----------	---	---	>6.0	---	---	>60	---	Moderate----	Moderate	Moderate.
84, 85, 86--------- Morval	B	None----------	---	---	>6.0	---	---	>60	---	Moderate----	High------	Low.
87*:												
Morval------------	B	None----------	---	---	>6.0	---	---	>60	---	Moderate----	High------	Low.
Tridell-----------	B	None----------	---	---	>6.0	---	---	>60	---	Low---------	High------	Moderate.
88*:												
Moyerson----------	D	None----------	---	---	>6.0	---	---	10-20	Soft	Moderate----	High------	Low.
Rock outcrop.												
89, 90, 91--------- Mussel	B	None----------	---	---	>6.0	---	---	>60	---	Moderate----	High------	Low.
92----------------- Redrob	C	Rare----------	---	---	1.5-4.0	Apparent	Jan-Dec	>60	---	Low---------	High------	Low.
93----------------- Rogert	D	None----------	---	---	>6.0	---	---	10-20	Hard	Low---------	Moderate	Low.
94*, 95*:												
Showalter---------	C	None----------	---	---	>6.0	---	---	>60	---	Moderate----	High------	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness		Uncoated steel	Concrete
					Ft			In				
94*, 95*:												
Morval-----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate---	High-----	Low.
96, 97, 98, 99---- Southace	B	None--------	---	---	>6.0	---	---	>60	---	Low--------	High-----	Low.
100*:												
Starley----------	D	None--------	---	---	>6.0	---	---	8-20	Hard	Low--------	High-----	Low.
Starman----------	D	None--------	---	---	>6.0	---	---	6-20	Hard	Moderate---	High-----	Low.
101*, 102*, 103*:												
Tanna------------	D	None--------	---	---	>6.0	---	---	20-40	Soft	Low--------	High-----	Low.
Pinelli----------	B	None--------	---	---	>6.0	---	---	>60	---	Low--------	High-----	Low.
104*:												
Torriorthents----	D	None--------	---	---	>6.0	---	---	4-30	Hard	Low--------	High-----	Low.
Camborthids------	D	None--------	---	---	>6.0	---	---	15-60	---	Low--------	High-----	Low.
Rock outcrop.												
105*:												
Torriorthents----	D	None--------	---	---	>6.0	---	---	4-40	Hard	Low--------	High-----	Low.
Rock outcrop.												
106*:												
Tridell----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate---	High-----	Moderate.
Brownsto---------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate---	High-----	Low.
107*, 108*, 109*, 110*:												
Uracca----------	B	None--------	---	---	>6.0	---	---	>60	---	Low--------	High-----	Low.
Mergel----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate---	Moderate	Low.
111--------------- Vandamore	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate---	Moderate	Low.
112--------------- Woodhall	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low--------	Moderate	Low.
113--------------- Woosley	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate---	High-----	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
114, 115, 116----- Yamo	B	None--------	---	---	>6.0	---	---	>60	---	Moderate---	High-----	High.
117*:												
Yeljack----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate---	Moderate	Low.
Callings---------	C	None--------	---	---	>6.0	---	---	>60	---	Moderate---	Moderate	Low.
118--------------- Youga	B	None--------	---	---	>6.0	---	---	>60	---	Moderate---	Moderate	Low.
119--------------- Zillman	B	None--------	---	---	>6.0	---	---	>60	---	Low--------	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Acree	Fine, montmorillonitic Aridic Argiborolls
Almy	Fine-loamy, mixed Borollic Haplargids
Ansari	Loamy, mixed Lithic Haploborolls
Ansel	Fine-loamy, mixed Typic Cryoboralfs
Antrobus	Loamy-skeletal, mixed Typic Cryoborolls
Anvik	Fine-loamy, mixed Boralfic Cryoborolls
Arle	Loamy-skeletal, mixed Aridic Haploborolls
Atencio	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aridic Argiustolls
Azeltine	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Torriorthentic Haplustolls
Brownsto	Loamy-skeletal, mixed Borollic Calciorthids
Callings	Clayey-skeletal, montmorillonitic Boralfic Cryoborolls
Camborthids	Camborthids
Charcol	Loamy-skeletal, mixed Cryic Pachic Paleborolls
Cochetopa	Fine, montmorillonitic Argic Pachic Cryoborolls
Coulterg	Fine-loamy, mixed Typic Haploborolls
Curecanti	Loamy-skeletal, mixed Typic Argiborolls
Cushool	Fine-loamy, mixed Borollic Haplargids
Dahlquist	Loamy-skeletal, mixed Borollic Haplargids
Dollard	Fine, montmorillonitic (calcareous), frigid Ustic Torriorthents
Dotsero	Coarse-loamy, mixed Pachic Haploborolls
Earsman	Loamy-skeletal, mixed (calcareous), frigid Lithic Ustic Torriorthents
Empedrado	Fine-loamy, mixed Typic Argiborolls
Etoe	Loamy-skeletal, mixed Typic Paleboralfs
Evanston	Fine-loamy, mixed Aridic Argiborolls
Fluvaquents	Fluvaquents
Forelle	Fine-loamy, mixed Borollic Haplargids
Forsey	Loamy-skeletal, mixed Argic Cryoborolls
Fughes	Fine, montmorillonitic Pachic Argiborolls
Goslin	Coarse-loamy, mixed (calcareous), frigid Ustic Torriorthents
Gothic	Fine, montmorillonitic Argic Cryoborolls
Grotte	Loamy-skeletal, mixed (calcareous), frigid Ustic Torriorthents
Gypsiorthids	Gypsiorthids
Ipson	Loamy-skeletal, mixed Aridic Argiborolls
Irrawaddy	Loamy-skeletal, carbonatic Typic Cryoborolls
Iyers	Fine, montmorillonitic (calcareous) Typic Cryorthents
Jerry	Fine, montmorillonitic Argic Cryoborolls
Jodero	Fine-loamy, mixed Cumulic Haploborolls
Kilgore	Fine-loamy over sandy or sandy-skeletal, mixed Cumulic Cryaquolls
Kobar	Fine, montmorillonitic Borollic Camborthids
Leavittville	Fine-loamy, mixed Pachic Cryoborolls
Mergel	Loamy-skeletal, mixed Torriorthentic Haploborolls
Millerlake	Fine-loamy, mixed Argic Pachic Cryoborolls
Mine	Coarse-loamy, mixed, nonacid Typic Cryorthents
Miracle	Fine-loamy, mixed Argic Cryoborolls
Moen	Fine-loamy, mixed Typic Argiborolls
Monad	Fine-loamy, mixed Argic Cryoborolls
Mord	Fine, montmorillonitic Boralfic Cryoborolls
Morval	Fine-loamy, mixed Aridic Argiborolls
Moyerson	Clayey, montmorillonitic (calcareous), frigid, shallow Ustic Torriorthents
Mussel	Fine-loamy, mixed (calcareous), frigid Ustic Torriorthents
Pinelli	Fine, montmorillonitic Borollic Haplargids
Redrob	Fine-loamy over sandy or sandy-skeletal, mixed (calcareous), frigid Fluvaquentic Haplaquolls
Rentsac	Loamy-skeletal, mixed (calcareous), frigid Lithic Ustic Torriorthents
Rogert	Loamy-skeletal, mixed Lithic Cryoborolls
Showalter	Clayey-skeletal, montmorillonitic Typic Argiborolls
Skylick	Fine-loamy, mixed Cryic Pachic Paleborolls
Sligting	Clayey-skeletal, montmorillonitic Cryic Pachic Paleborolls
Southace	Loamy-skeletal, mixed (calcareous), frigid Ustic Torriorthents
Starley	Loamy-skeletal, mixed Lithic Cryoborolls
Starman	Loamy-skeletal, mixed (calcareous) Lithic Cryorthents

TABLE 17.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
*Tanna	Fine, montmorillonitic Aridic Argiborolls
Torriorthents	Torriorthents
Tridell	Loamy-skeletal, mixed Aridic Calciborolls
Uracca	Loamy-skeletal, mixed Aridic Argiborolls
Vandamore	Loamy-skeletal, mixed (calcareous) Typic Cryorthents
Woodhall	Loamy-skeletal, mixed Argic Cryoborolls
Woosley	Fine-loamy, mixed Argic Cryoborolls
Yamo	Fine-loamy, mixed Borollic Camborthids
Yeljack	Fine-loamy, mixed Cryic Pachic Paleborolls
Youga	Fine-loamy, mixed Argic Cryoborolls
Zillman	Loamy-skeletal, mixed Aridic Argiborolls

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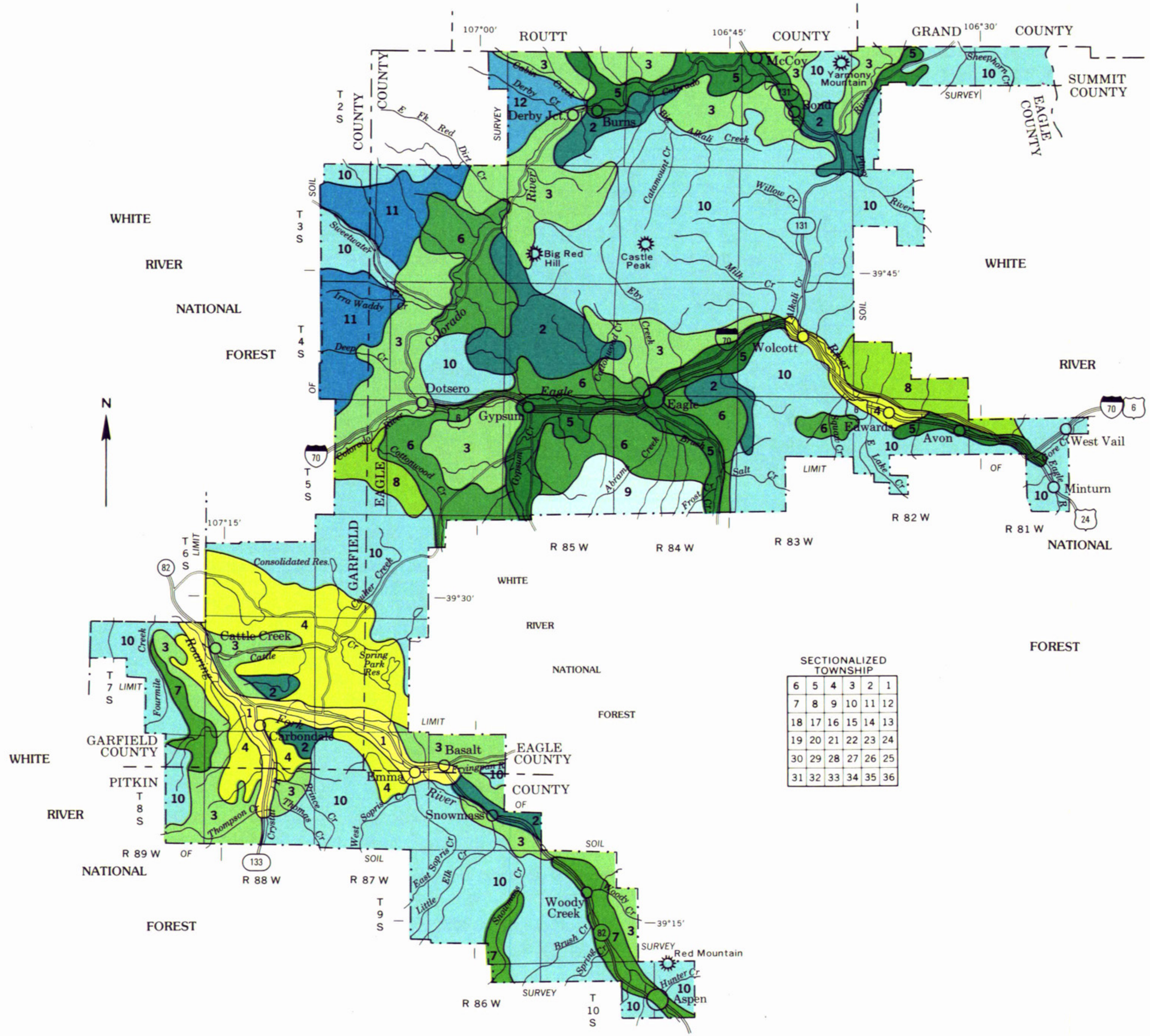


6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SOIL LEGEND

SOILS ON ALLUVIAL VALLEY FLOORS, FLOOD PLAINS, FANS, AND TERRACES

1 ATENCIO-REDROB-AZELTINE: Gently sloping and strongly sloping, somewhat poorly drained and well drained, deep soils; on alluvial valley floors, flood plains, fans, and terraces

DOMINANTLY COOL SOILS IN THE MOUNTAINS

2 BROWNSTO-SHOWALTER-TRIDELL: Strongly sloping to very steep, well drained and somewhat excessively drained, deep soils; on fans, terraces, and mountainsides

3 EARSMAN-CUSHOOL-RENTSAC: Moderately steep to very steep, well drained and somewhat excessively drained, shallow and moderately deep soils; on mountainsides, ridges, hills, and mesa side slopes

4 EMPEDRADO-MORVAL-EVANSTON: Gently sloping to very steep, well drained, deep soils; on hills, fans, and valley sides

5 FORELLE-YAMO-ALMY: Gently sloping to steep, well drained, deep soils; on fans, benches, toe slopes, and mountains

6 GYPSUM LAND-GYPSIORTHIDS: Gypsum land and moderately steep to very steep, well drained, shallow and moderately deep soils; on eroded hills, mountainsides, and breaks

7 JERRY-URACCA-MERGEL: Gently sloping to very steep, well drained, deep soils; on alluvial fans, terraces, valley sides, and hills

8 VANDAMORE-COULTERG: Moderately steep to very steep, well drained, moderately deep and deep soils; on mountainsides and fans

DOMINANTLY COLD SOILS IN THE MOUNTAINS

9 CALLINGS-YELJACK: Moderately steep to very steep, well drained, deep soils; on ridgetops, mountainsides, and benches

10 JERRY-COCHETOPA-FORSEY: Gently sloping to very steep, well drained, deep soils; on alluvial fans, hills, valley sides, mountainsides, and ridges

11 LEAVITTVILLE-ANVIK-ANSEL: Gently sloping to very steep, well drained, deep soils; on mesas, alluvial fans, and mountainsides

12 MOEN-WOODHALL-IPSON: Gently sloping to very steep, well drained, moderately deep and deep soils; on uplands, valley sides, mountainsides, ridges, terraces, and fans

Compiled 1984

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
COLORADO AGRICULTURAL EXPERIMENT STATION

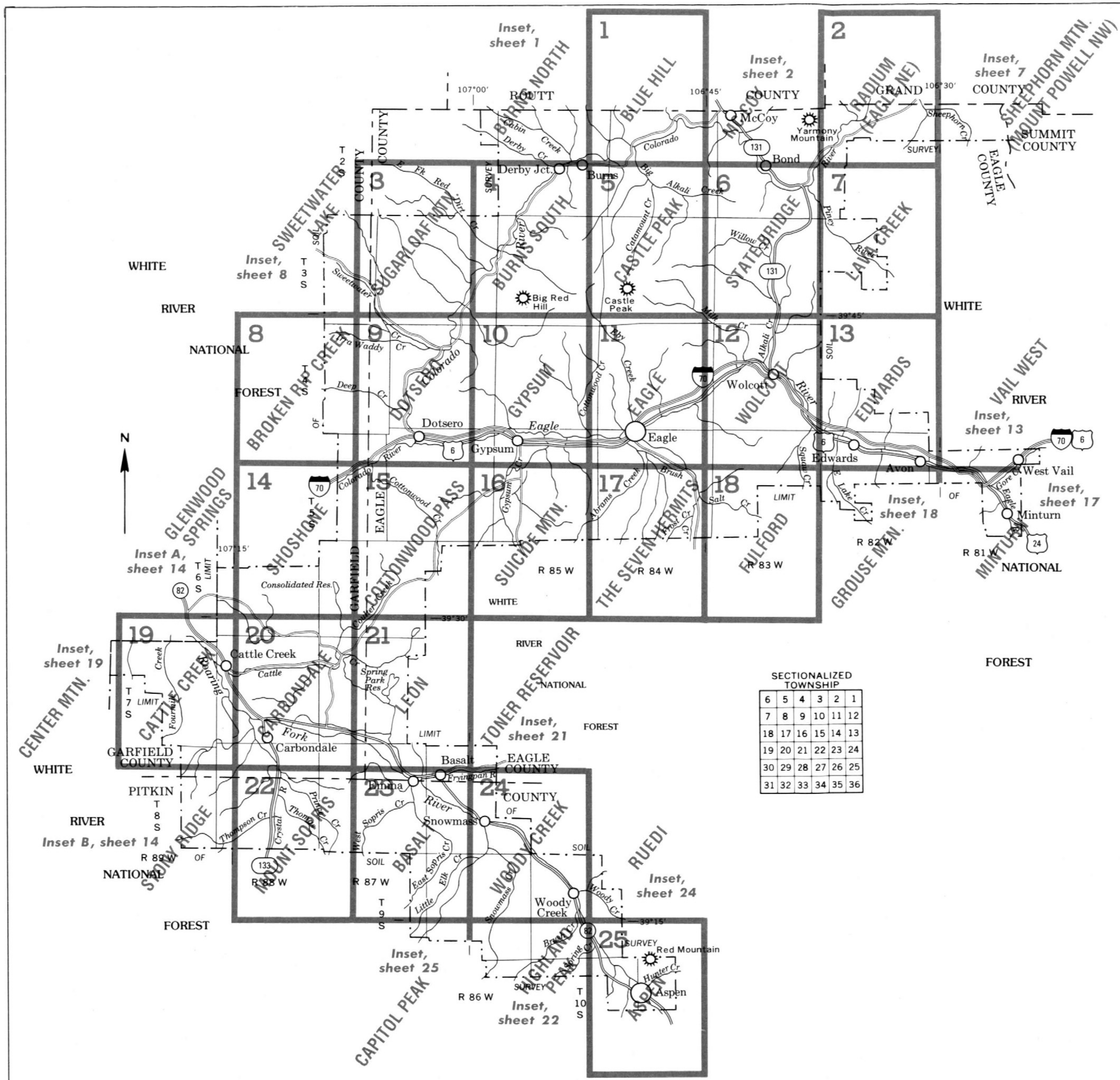
GENERAL SOIL MAP

ASPEN-GYPSUM AREA
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
COLORADO

Scale 1:380,160

1 0 1 2 3 4 5 6 Miles

1 0 6 12 Km



INDEX TO MAP SHEETS

ASPEN-GYPSUM AREA
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
COLORADO

Scale 1:380,160

1 0 1 2 3 4 5 6 Miles

1 0 6 12 Km

SOIL LEGEND

SYMBOL	NAME
1	Acree very stony sandy loam, 3 to 12 percent slopes
2	Acree very stony sandy loam, 12 to 25 percent slopes
3	Acree loam, 3 to 6 percent slopes
4	Acree loam, 6 to 12 percent slopes
5	Acree loam, 12 to 25 percent slopes
6	Almy loam, 1 to 12 percent slopes
7	Almy loam, 12 to 25 percent slopes
8	Ansel-Anvik association, 12 to 25 percent slopes
9	Ansel-Anvik association, 25 to 45 percent slopes
10	Anvik-Skylick-Sligting association, 10 to 25 percent slopes
11	Anvik-Skylick-Sligting association, 25 to 50 percent slopes
12	Arle-Ansari-Rock outcrop complex, 12 to 50 percent slopes
13	Atencio-Azeltine complex, 3 to 6 percent slopes
14	Callings-Yeljack complex, 25 to 65 percent slopes
15	Charcol-Mord complex, 12 to 25 percent slopes
16	Charcol-Mord complex, 25 to 50 percent slopes
17	Cochetopa-Antrobus association, 6 to 12 percent slopes
18	Cochetopa-Antrobus association, 12 to 25 percent slopes
19	Cochetopa-Antrobus association, 25 to 50 percent slopes
20	Coulterg loam, 12 to 50 percent slopes
21	Curecanti-Fughes complex, 6 to 12 percent slopes
22	Curecanti-Fughes complex, 12 to 25 percent slopes
23	Cushool fine sandy loam, 12 to 25 percent slopes
24	Cushool fine sandy loam, 25 to 50 percent slopes
25	Cushool-Rentsac complex, 15 to 65 percent slopes
26	Dahlquist-Southace complex, 6 to 12 percent slopes
27	Dahlquist-Southace complex, 12 to 25 percent slopes
28	Dahlquist-Southace complex, 25 to 50 percent slopes
29	Dollard-Rock outcrop, shale complex, 12 to 25 percent slopes
30	Dollard-Rock outcrop, shale complex, 25 to 65 percent slopes
31	Dotsero gravelly sandy loam, 5 to 25 percent slopes
32	Dotsero sandy loam, 1 to 12 percent slopes
33	Earsman-Rock outcrop complex, 12 to 65 percent slopes
34	Empedrado loam, 2 to 6 percent slopes
35	Empedrado loam, 6 to 12 percent slopes
36	Empedrado loam, 12 to 25 percent slopes
37	Etoe loam, 15 to 50 percent slopes
38	Evanston loam, 1 to 6 percent slopes
39	Evanston loam, 6 to 25 percent slopes
40	Evanston loam, 25 to 45 percent slopes
41	Evanston loam, 45 to 65 percent slopes
42	Fluvaquents, 0 to 10 percent slopes
43	Forelle-Brownsto complex, 6 to 12 percent slopes
44	Forelle-Brownsto complex, 12 to 25 percent slopes
45	Forsey cobbly loam, 3 to 12 percent slopes
46	Forsey cobbly loam, 12 to 25 percent slopes
47	Forsey cobbly loam, 25 to 65 percent slopes
48	Fughes stony loam, 3 to 12 percent slopes
49	Goslin fine sandy loam, 3 to 6 percent slopes
50	Goslin fine sandy loam, 6 to 25 percent slopes
51	Gothic loam, 1 to 6 percent slopes
52	Gothic loam, 6 to 25 percent slopes
53	Gothic loam, 25 to 65 percent slopes
54	Grotte gravelly loam, 25 to 65 percent slopes
55	Gypsumland-Gypsiorthid complex, 12 to 65 percent slopes
56	Ipson cobbly loam, 3 to 25 percent slopes
57	Ipson cobbly loam, 25 to 50 percent slopes
58	Irrawaddy very stony loam, 25 to 65 percent slopes
59	Iyers loam, 6 to 25 percent slopes
60	Iyers loam, 25 to 65 percent slopes
61	Iyers silty clay loam, 6 to 25 percent slopes
62	Iyers silty clay loam, 25 to 65 percent slopes
63	Jerry loam, 12 to 25 percent slopes
64	Jerry loam, 25 to 65 percent slopes
65	Jerry-Millerlake loams, 1 to 6 percent slopes
66	Jerry-Millerlake loams, 6 to 25 percent slopes
67	Jerry-Millerlake loams, 25 to 45 percent slopes
68	Jodero loam, 1 to 12 percent slopes
69	Kilgore silt loam
70	Kobar silty clay loam, 1 to 6 percent slopes
71	Kobar silty clay loam, 6 to 12 percent slopes
72	Kobar silty clay loam, 12 to 25 percent slopes
73	Kobar silty clay loam, dry, 3 to 25 percent slopes
74	Leavittville loam, 4 to 25 percent slopes
75	Millerlake loam, 15 to 30 percent slopes
76	Mine loam, 12 to 25 percent slopes
77	Mine loam, 25 to 65 percent slopes
78	Miracle loam, 3 to 30 percent slopes
79	Moen stony loam, 1 to 6 percent slopes
80	Moen stony loam, 6 to 12 percent slopes
81	Moen stony loam, 12 to 25 percent slopes
82	Monad fine sandy loam, 12 to 25 percent slopes
83	Monad fine sandy loam, 25 to 50 percent slopes
84	Morval loam, 1 to 6 percent slopes
85	Morval loam, 6 to 25 percent slopes
86	Morval loam, 25 to 40 percent slopes
87	Morval-Tridell complex, 12 to 50 percent slopes
88	Moyerson-Rock outcrop complex, 15 to 60 percent slopes
89	Mussel loam, 1 to 6 percent slopes
90	Mussel loam, 6 to 12 percent slopes
91	Mussel loam, 12 to 25 percent slopes
92	Redrob loam, 1 to 6 percent slopes
93	Rogert very stony sandy loam, 25 to 65 percent slopes
94	Showalter-Morval complex, 5 to 15 percent slopes
95	Showalter-Morval complex, 15 to 25 percent slopes
96	Southace cobbly sandy loam, 1 to 6 percent slopes
97	Southace cobbly sandy loam, 6 to 12 percent slopes
98	Southace cobbly sandy loam, 12 to 25 percent slopes
99	Southace cobbly sandy loam, 25 to 65 percent slopes
100	Starley-Starman very channery loams, 3 to 25 percent slopes
101	Tanna-Pinelli complex, 1 to 6 percent slopes
102	Tanna-Pinelli complex, 6 to 12 percent slopes
103	Tanna-Pinelli complex, 12 to 25 percent slopes
104	Torriorthents-Camborthids-Rock outcrop complex, 6 to 65 percent slopes
105	Torriorthents-Rock outcrop complex, 45 to 95 percent slopes
106	Tridell-Brownsto stony sandy loams, 12 to 50 percent slopes, extremely stony
107	Uracca, moist-Mergel complex, 1 to 6 percent slopes, extremely stony
108	Uracca, moist-Mergel complex, 6 to 12 percent slopes, extremely stony
109	Uracca, moist-Mergel complex, 12 to 25 percent slopes, extremely stony
110	Uracca, moist-Mergel complex, 25 to 65 percent slopes, extremely stony
111	Vandamore channery sandy loam, 25 to 65 percent slopes
112	Woodhall gravelly loam, 6 to 50 percent slopes, extremely stony
113	Woosley loam, 3 to 30 percent slopes
114	Yamo loam, 1 to 6 percent slopes
115	Yamo loam, 6 to 12 percent slopes
116	Yamo loam, 12 to 25 percent slopes
117	Yeljack-Callings complex, 12 to 25 percent slopes
118	Youga loam, 12 to 30 percent slopes
119	Zillman very flaggy loam, 25 to 65 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Swift Airport; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS (Show as indicated below)

- Large (to scale)
- Medium or Small — water

PITS (solid line areas>10 acres) — w

- Gravel pit <10 acres
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp <2.5 acres
- Spring
- Well, artesian
- Well, irrigation
- Wet spot <2.5 acres

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 11 12

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE (normally not shown) — S

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop Less than 2.5 acres (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope) (1 symbol for each 10 to 15 acres)
- Stony spot, very stony spot

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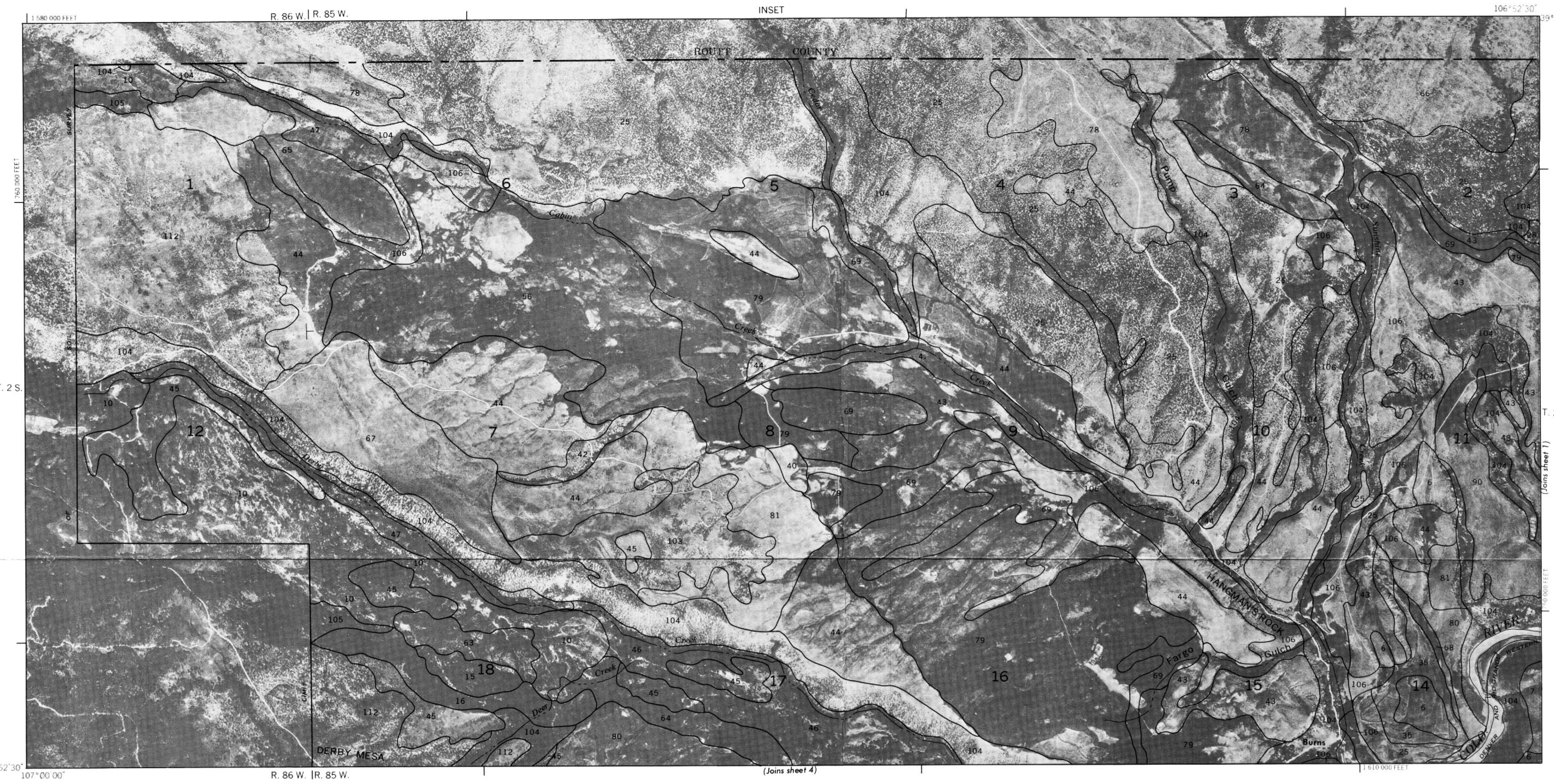

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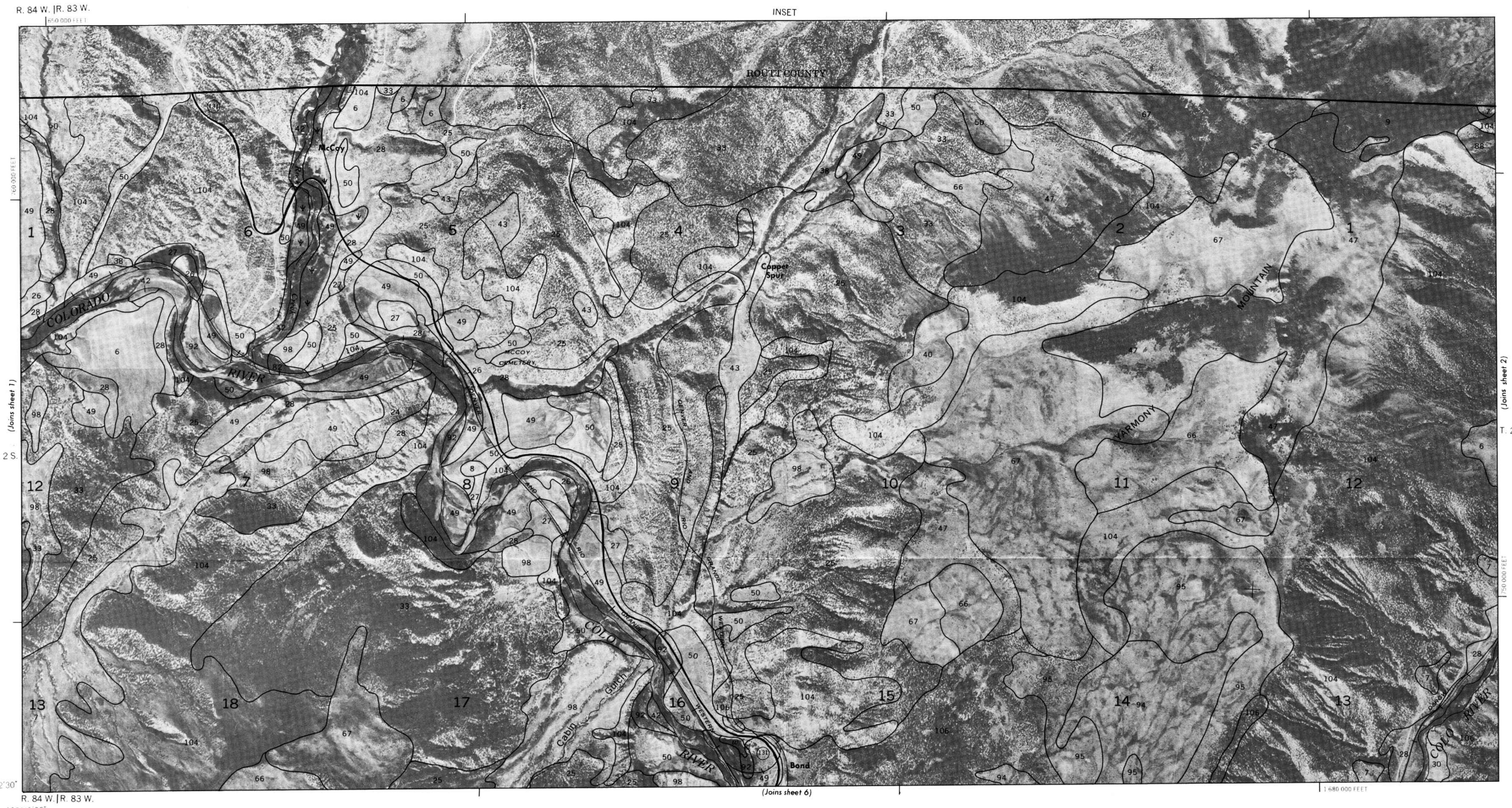
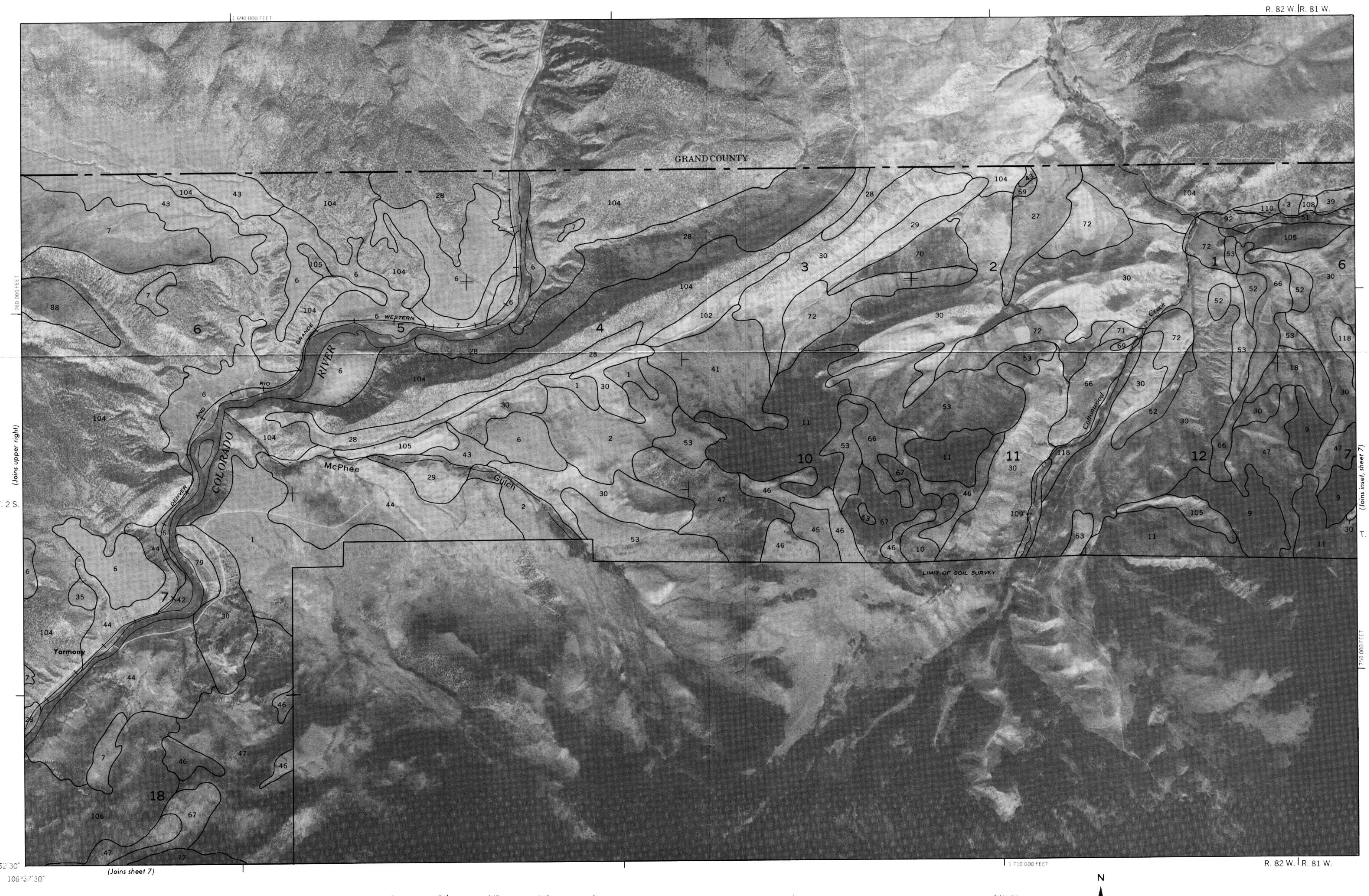
SCALE 1:24 000





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1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

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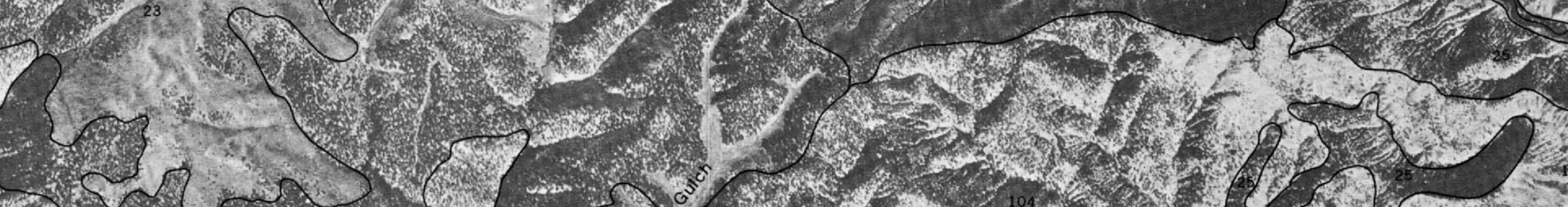

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1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

ASPEN-GYPSUM AREA, COLORADO NO. 4

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 5
SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(CASTLE PEAK QUADRANGLE)

SCALE 1:24 000
1 ¾ ½ ¼ 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS

N

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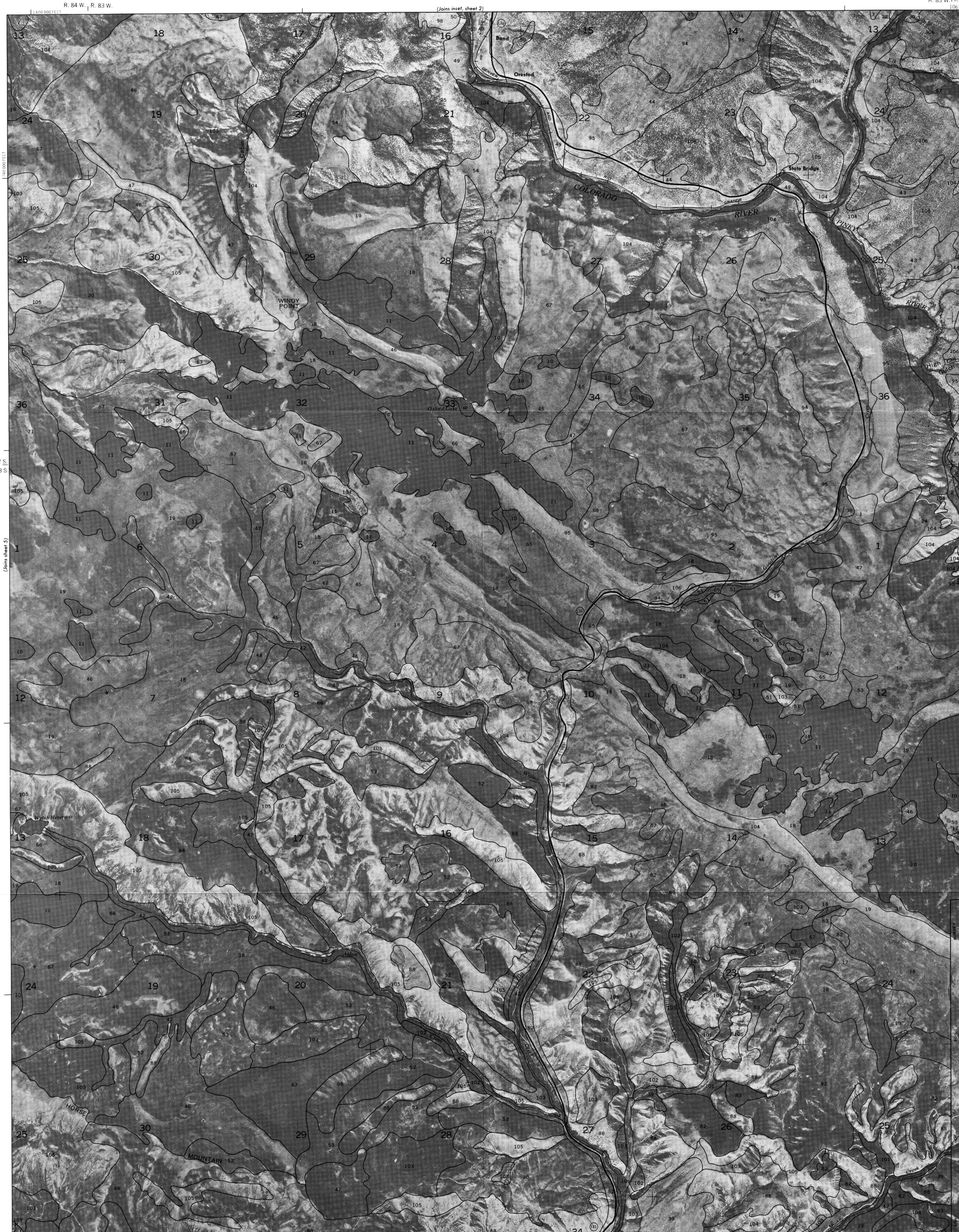
SOIL CONSERVATION SERVICE

SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(STATE BRIDGE QUADRANGLE)



1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

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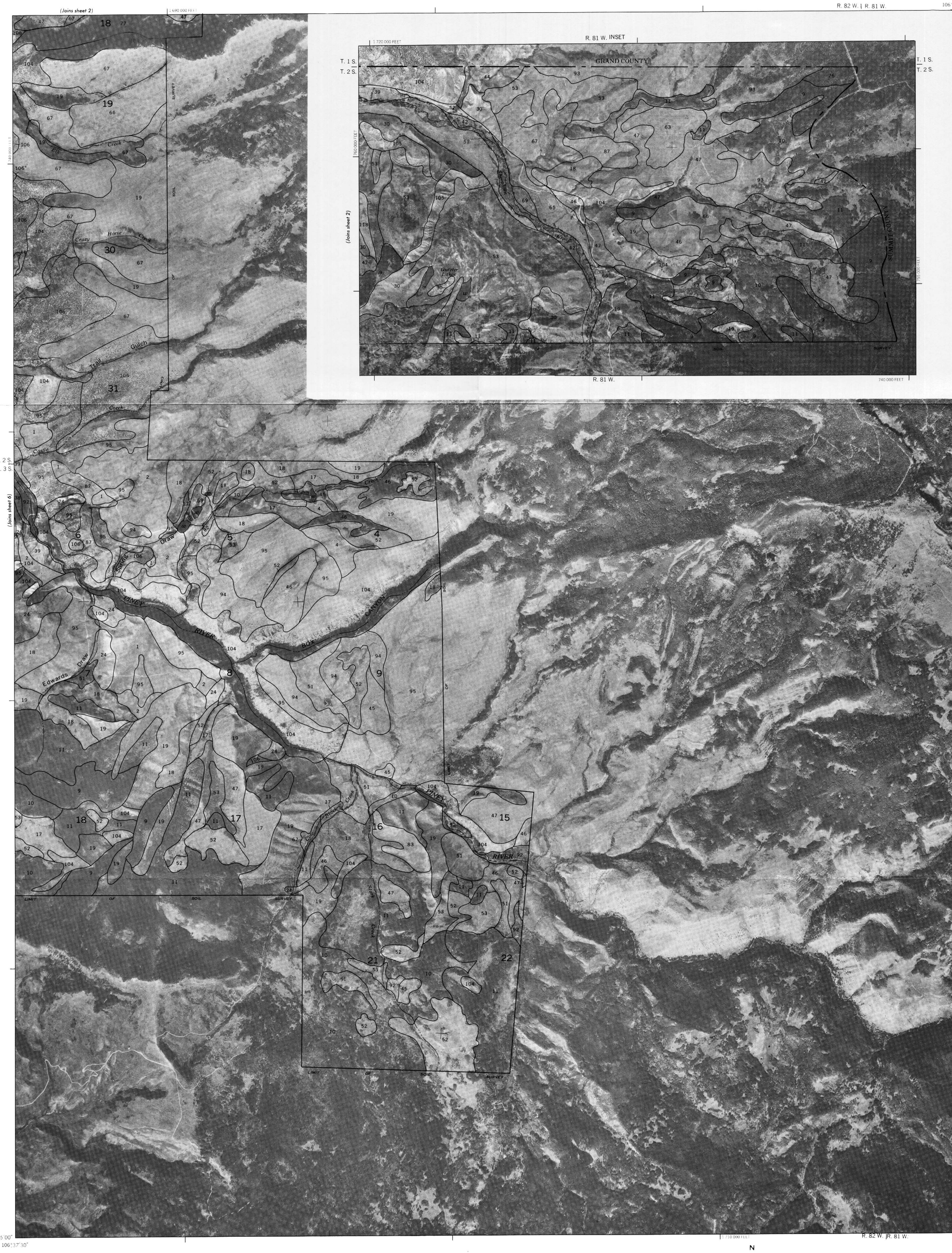
ASPEN-GYPSUM AREA, COLORADO NO. 6

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 7
SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(LAVA CREEK QUADRANGLE)



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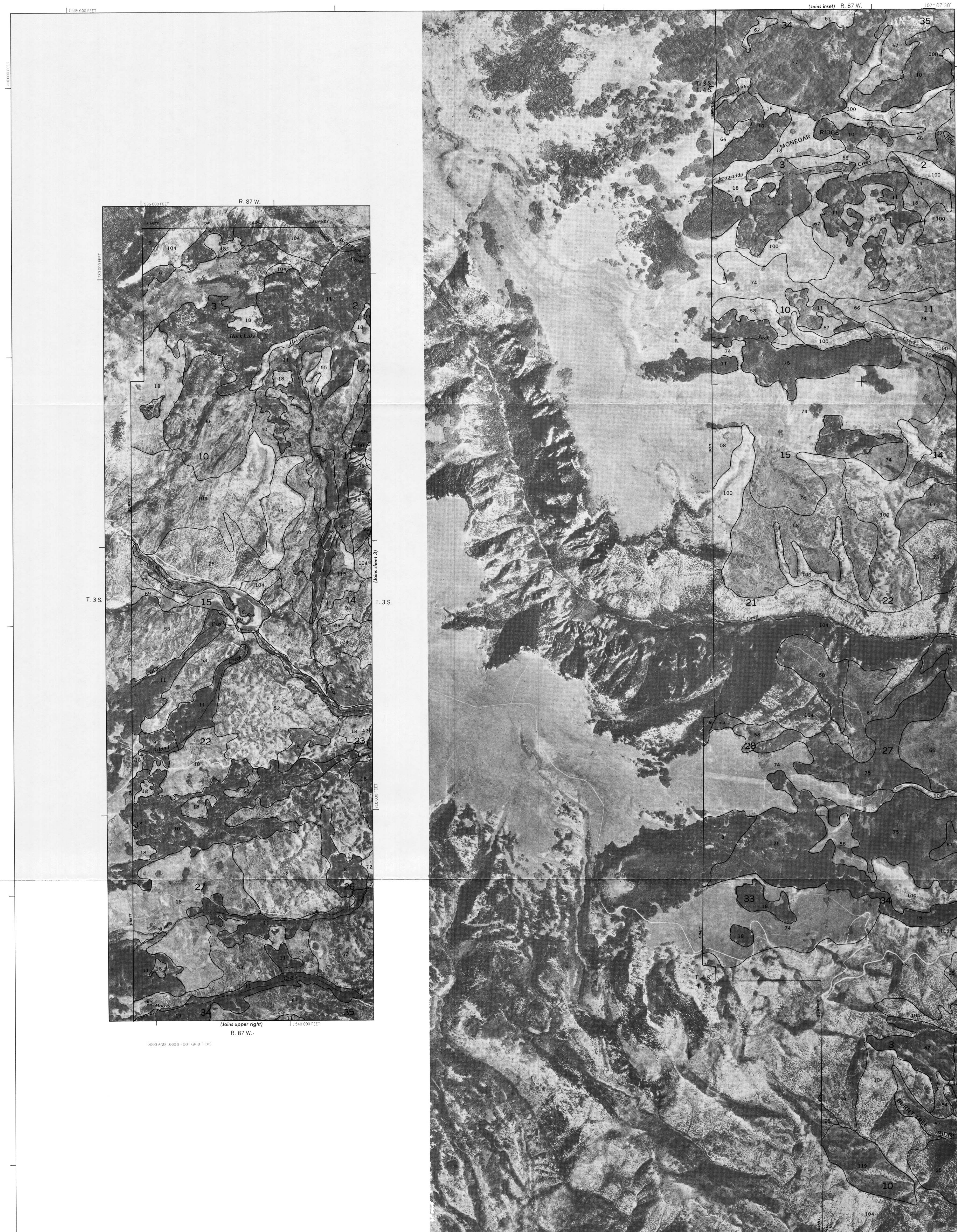

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1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 9
SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(DOTSERO QUADRANGLE)

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1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

SCALE 1:24 000

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1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

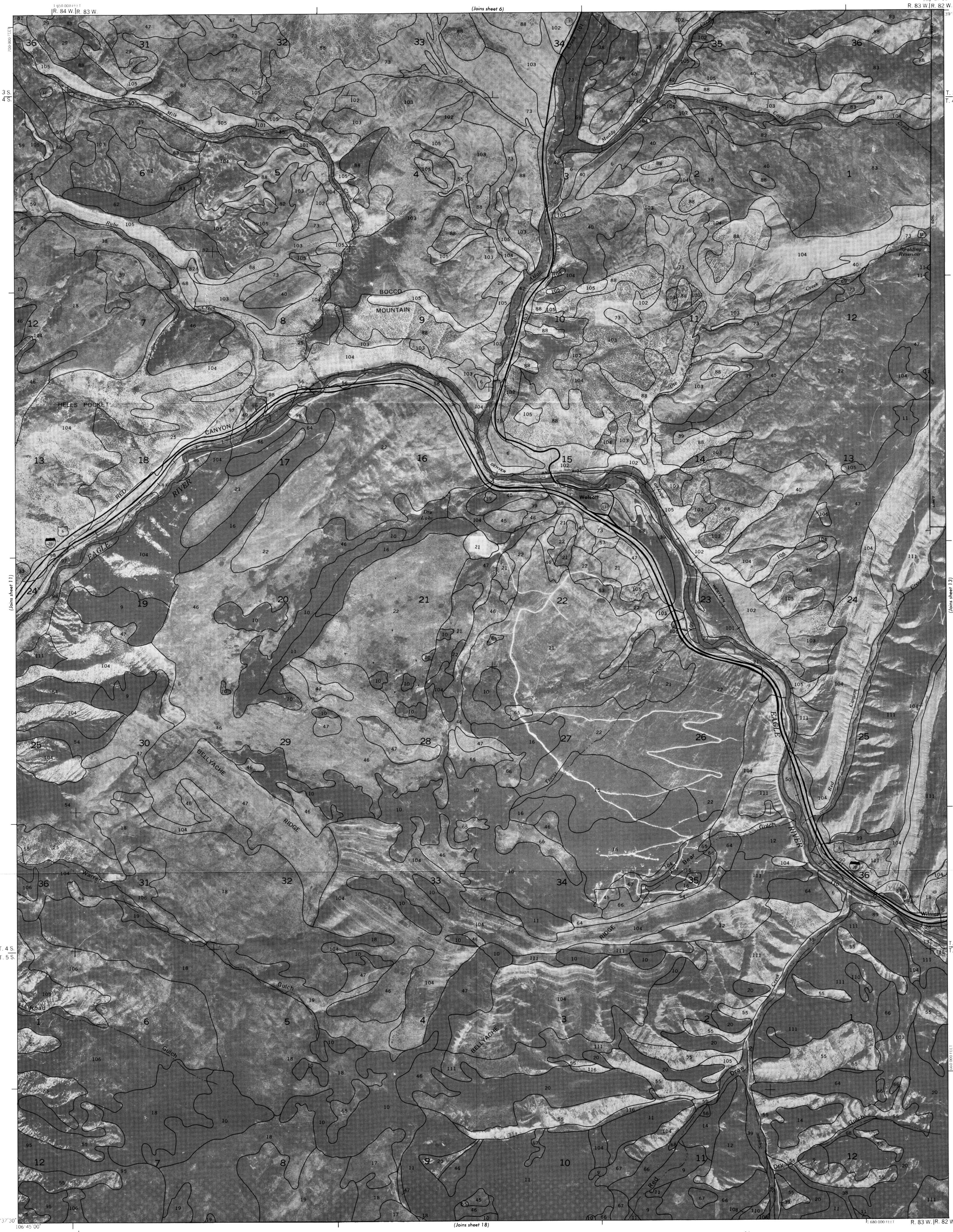
SCALE 1:24 000

N

ASPEN-GYPSUM AREA, COLORADO NO. 11

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 12
SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(WOLCOTT QUADRANGLE)



1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

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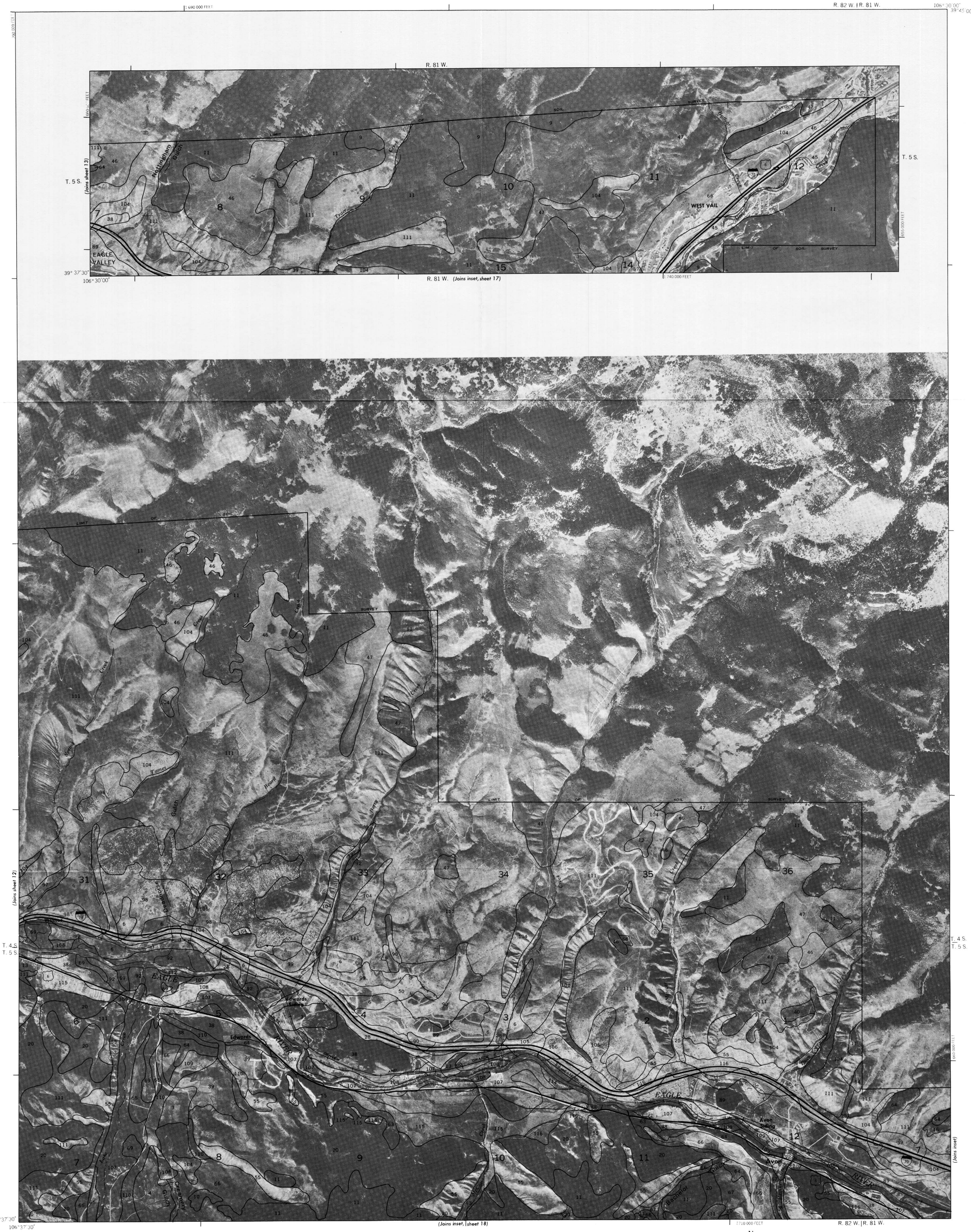

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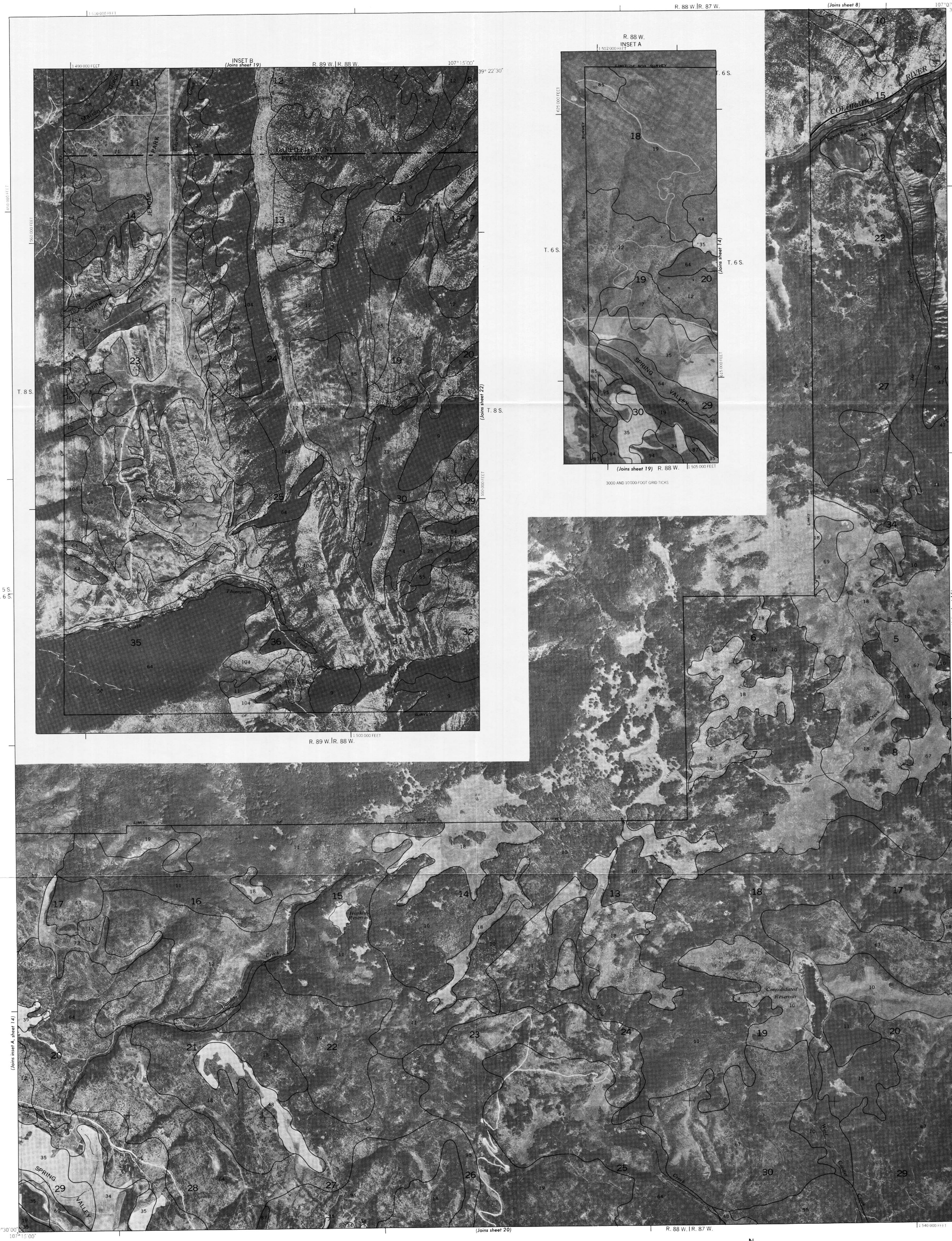
SCALE 1:24 000

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 14
SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(SHOSHONE QUADRANGLE)



1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

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ASPEN-GYPSUM AREA, COLORADO NO. 14

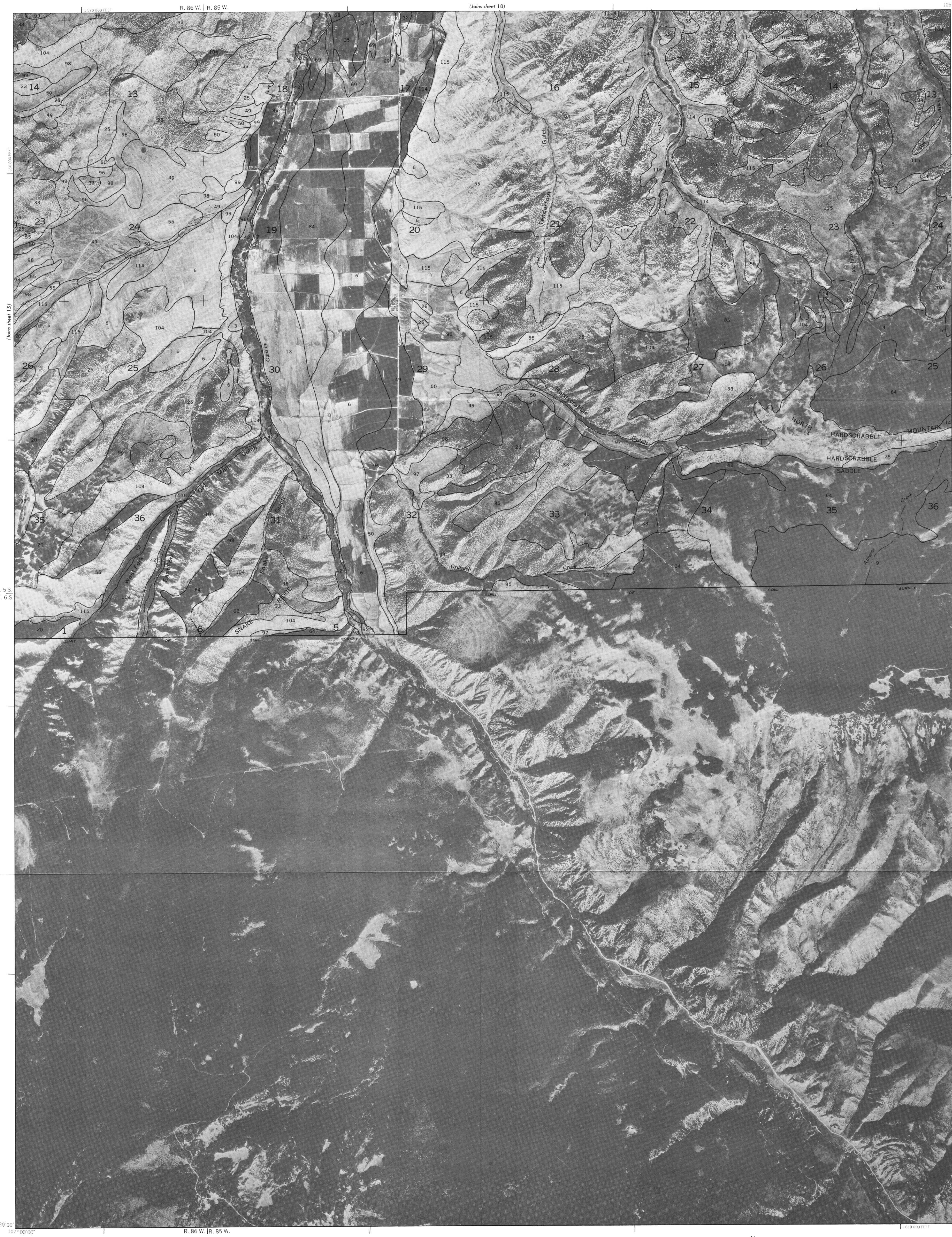
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO.15
SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(COTTONWOOD PASS QUADRANGLE)

SCALE 1:24 000
1 MILES 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS

N

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

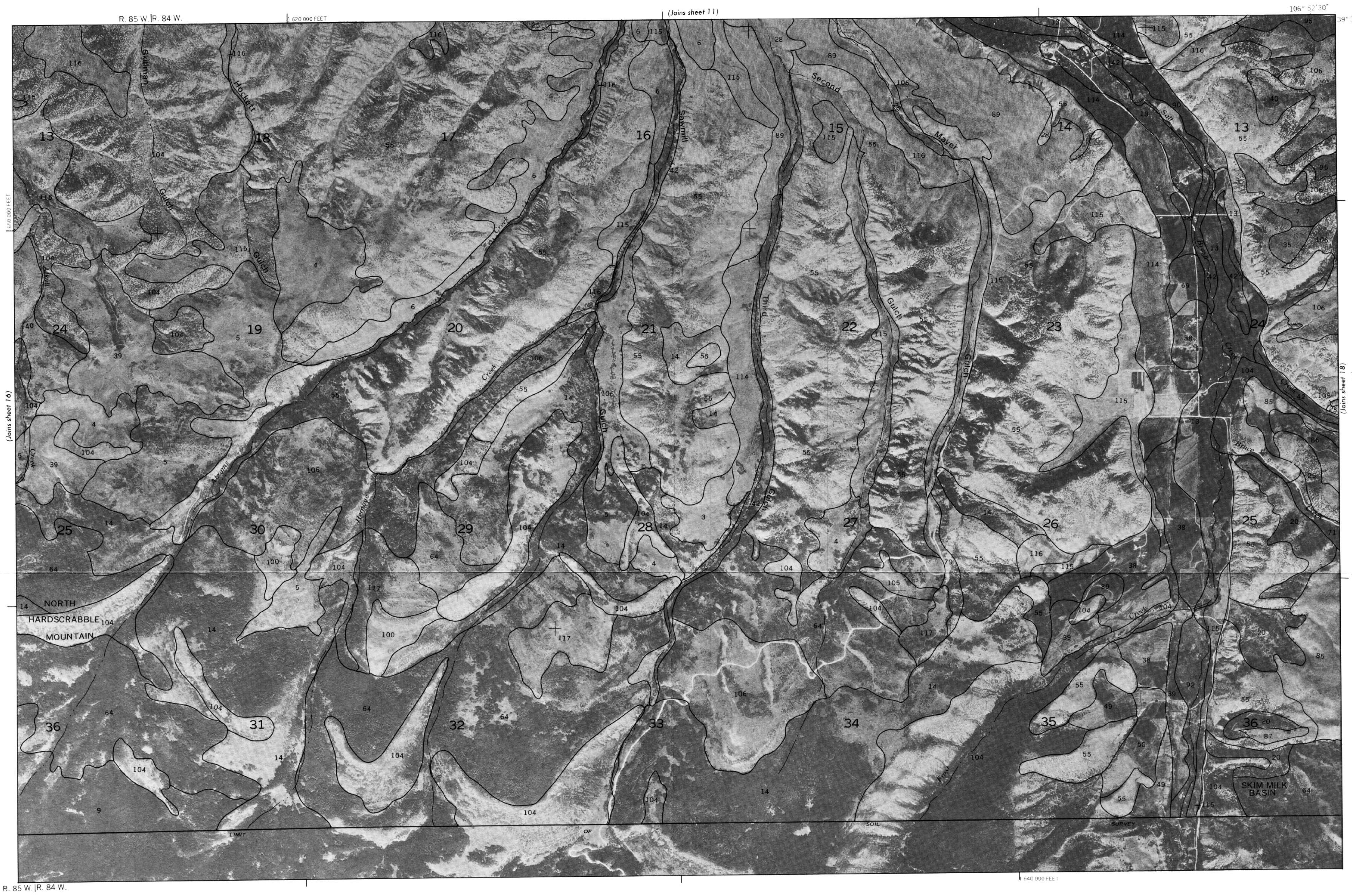
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

ASPEN-GYPSUM AREA, COLORADO NO. 16



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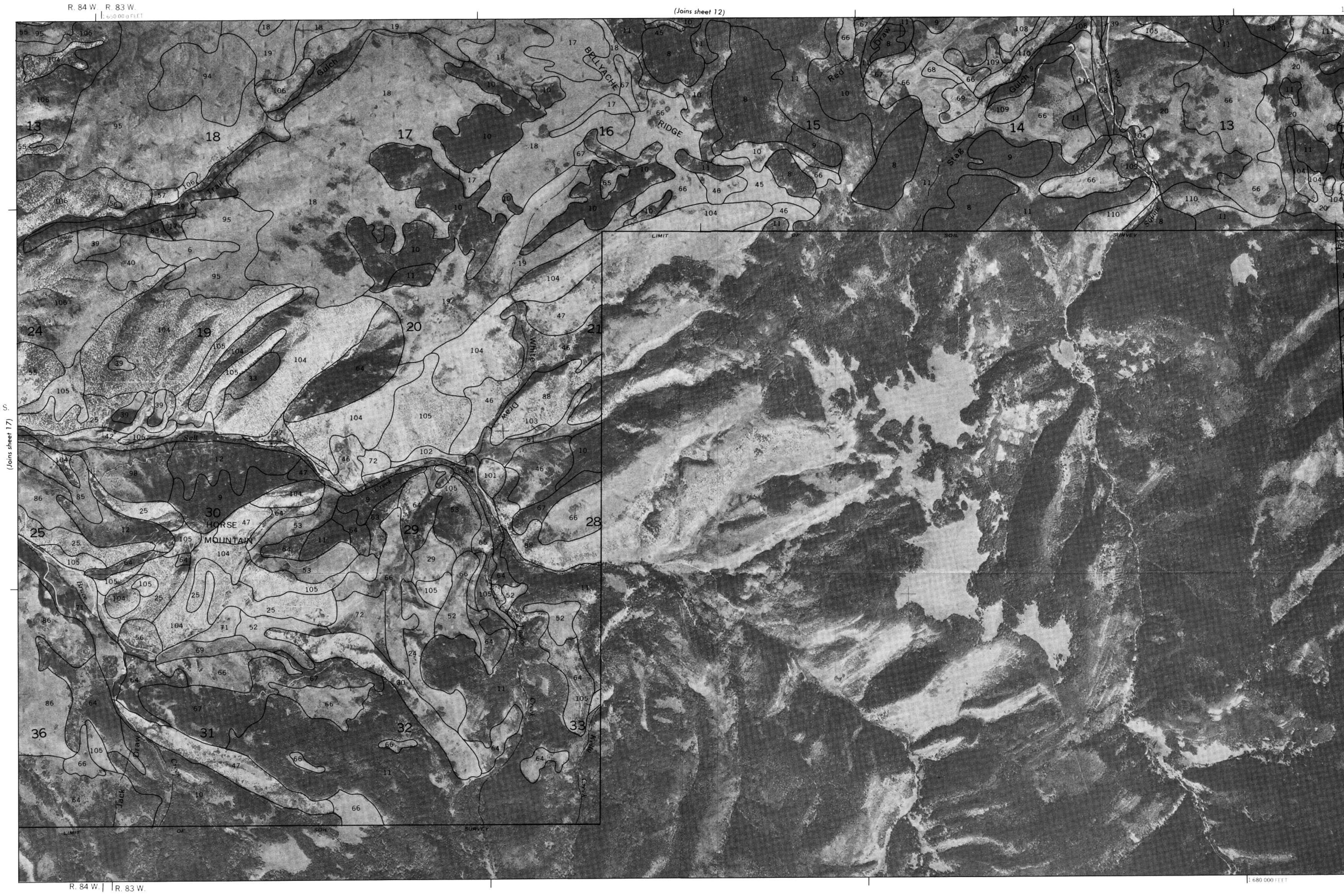
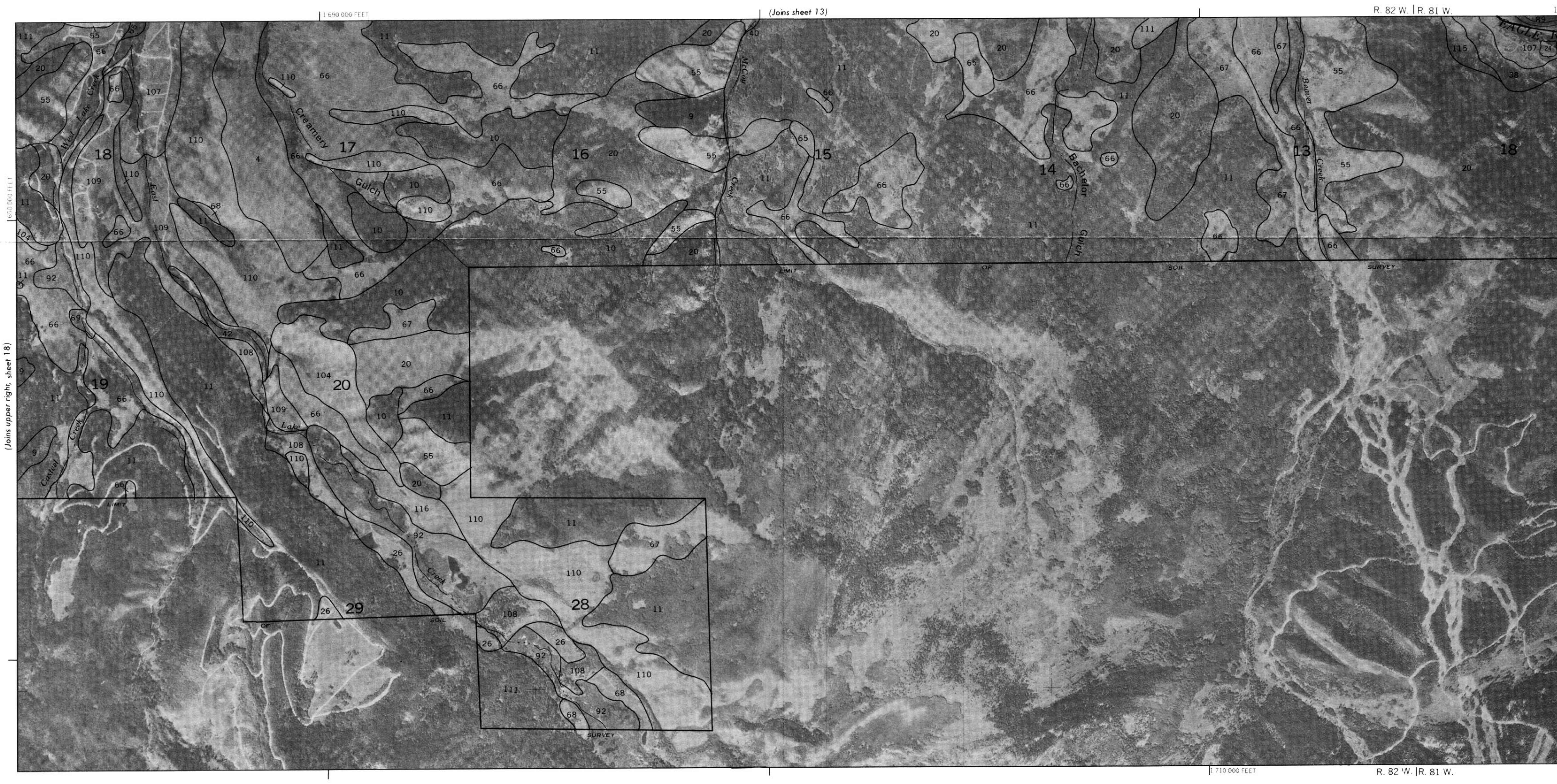
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000



INSET



1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

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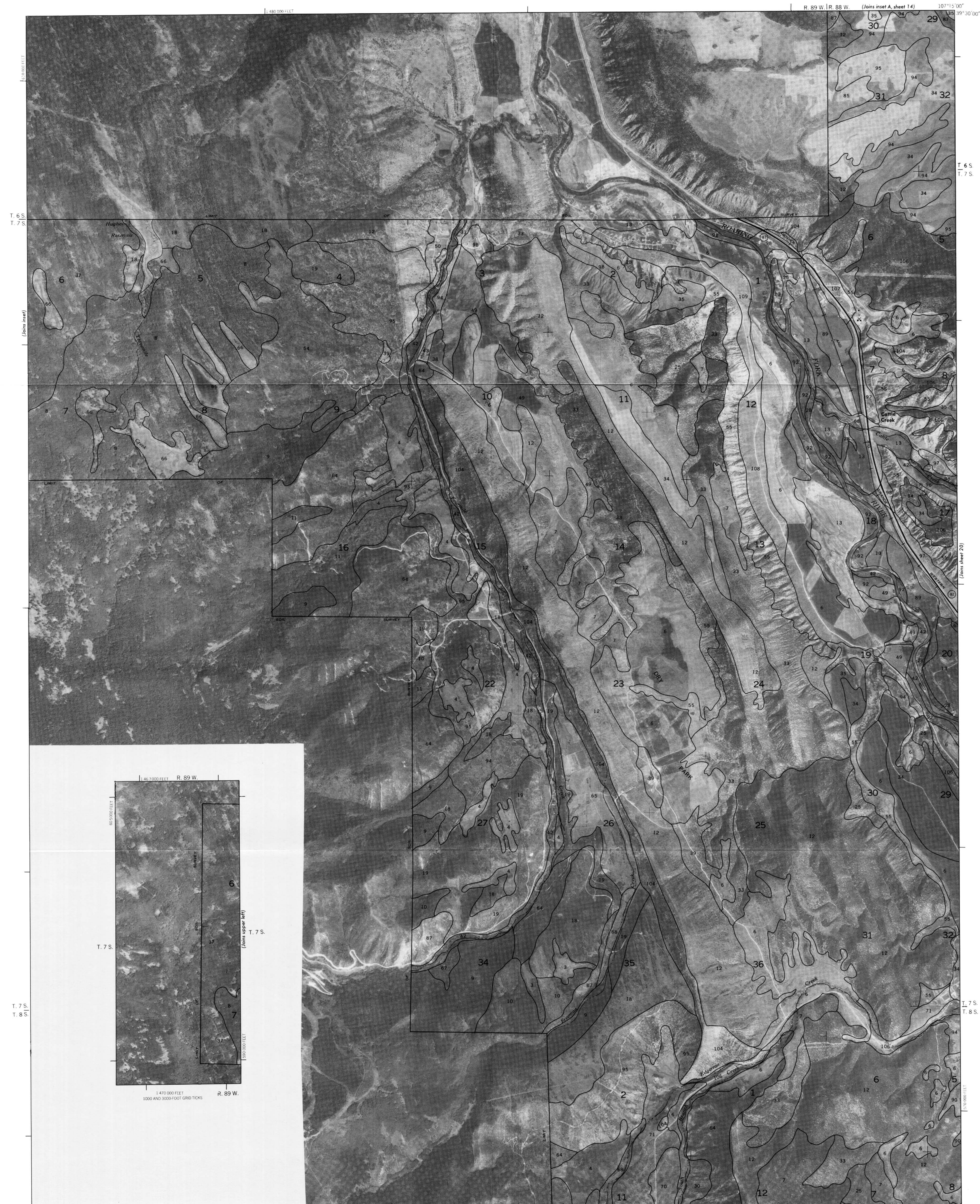

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

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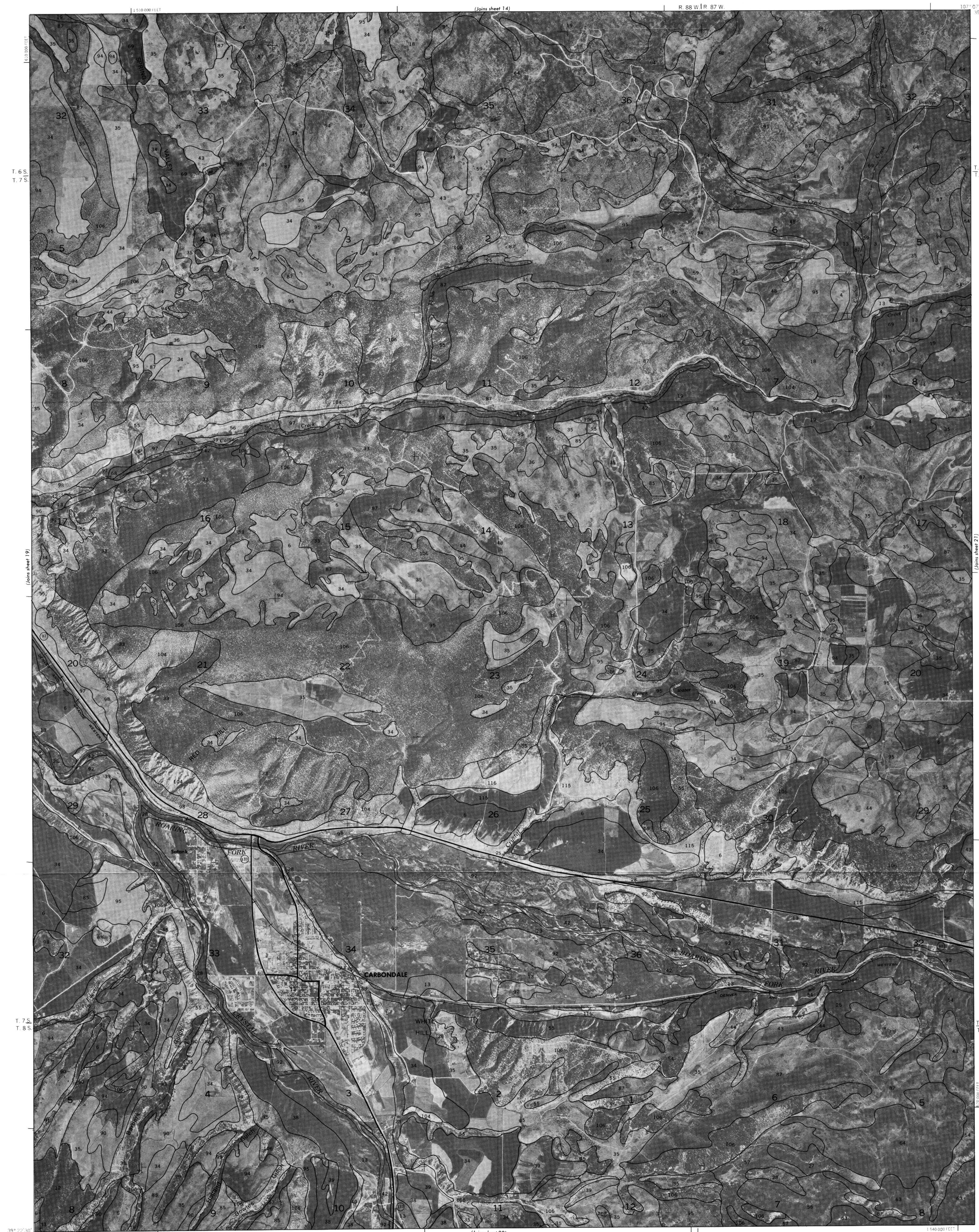

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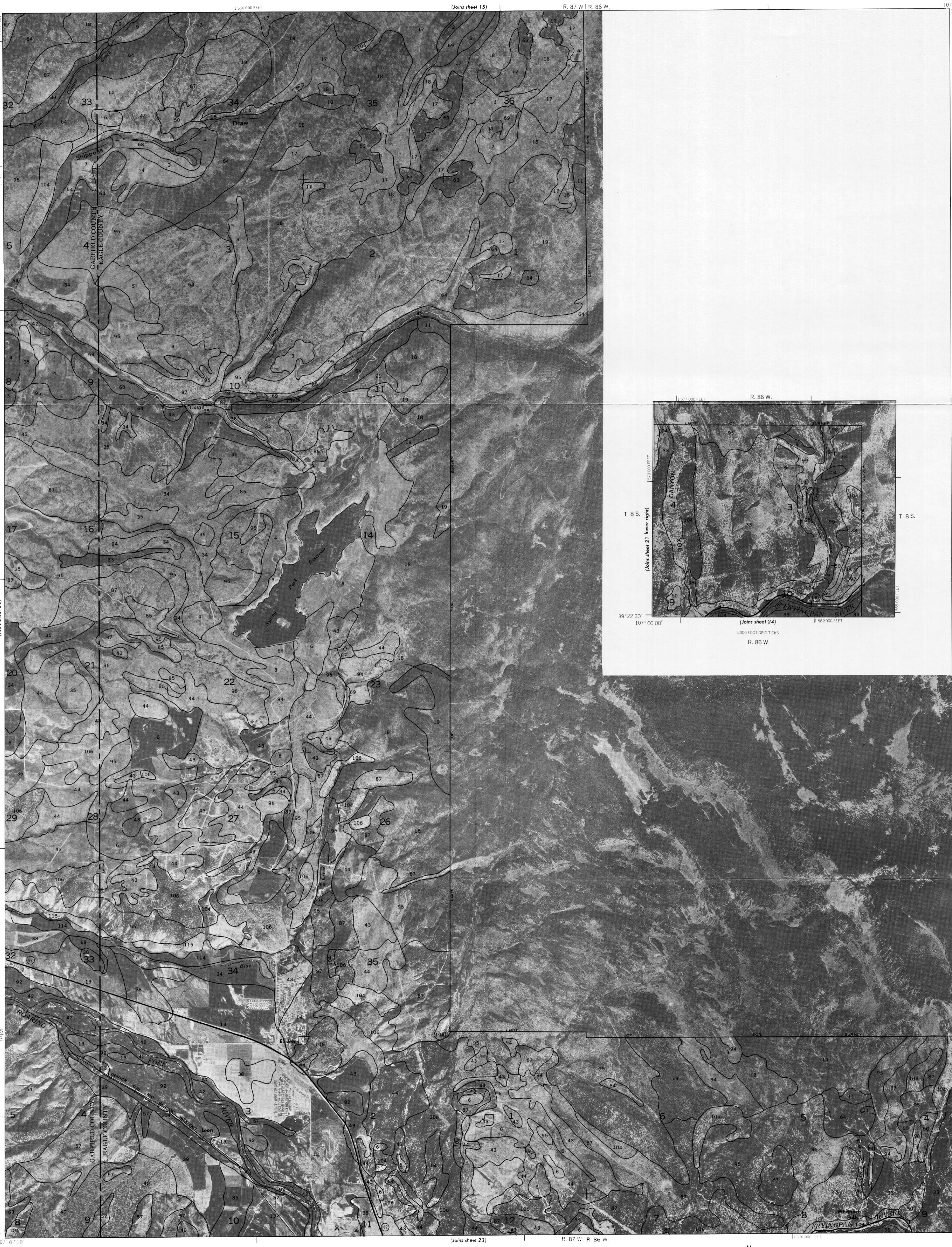
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

ASPEN-GYPSUM AREA, COLORADO NO. 20

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(LEON QUADRANGLE)



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

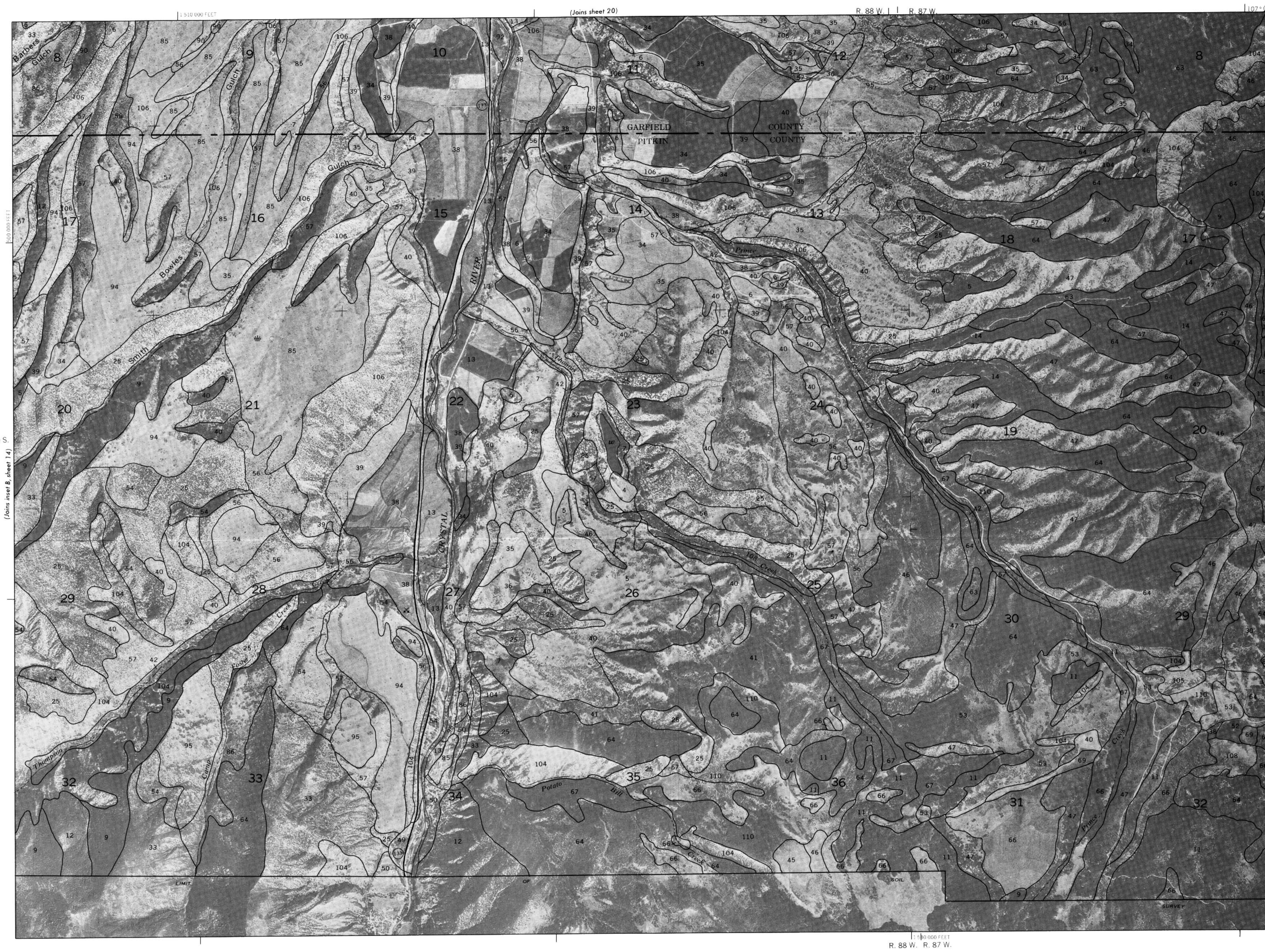
SCALE 1:24 000

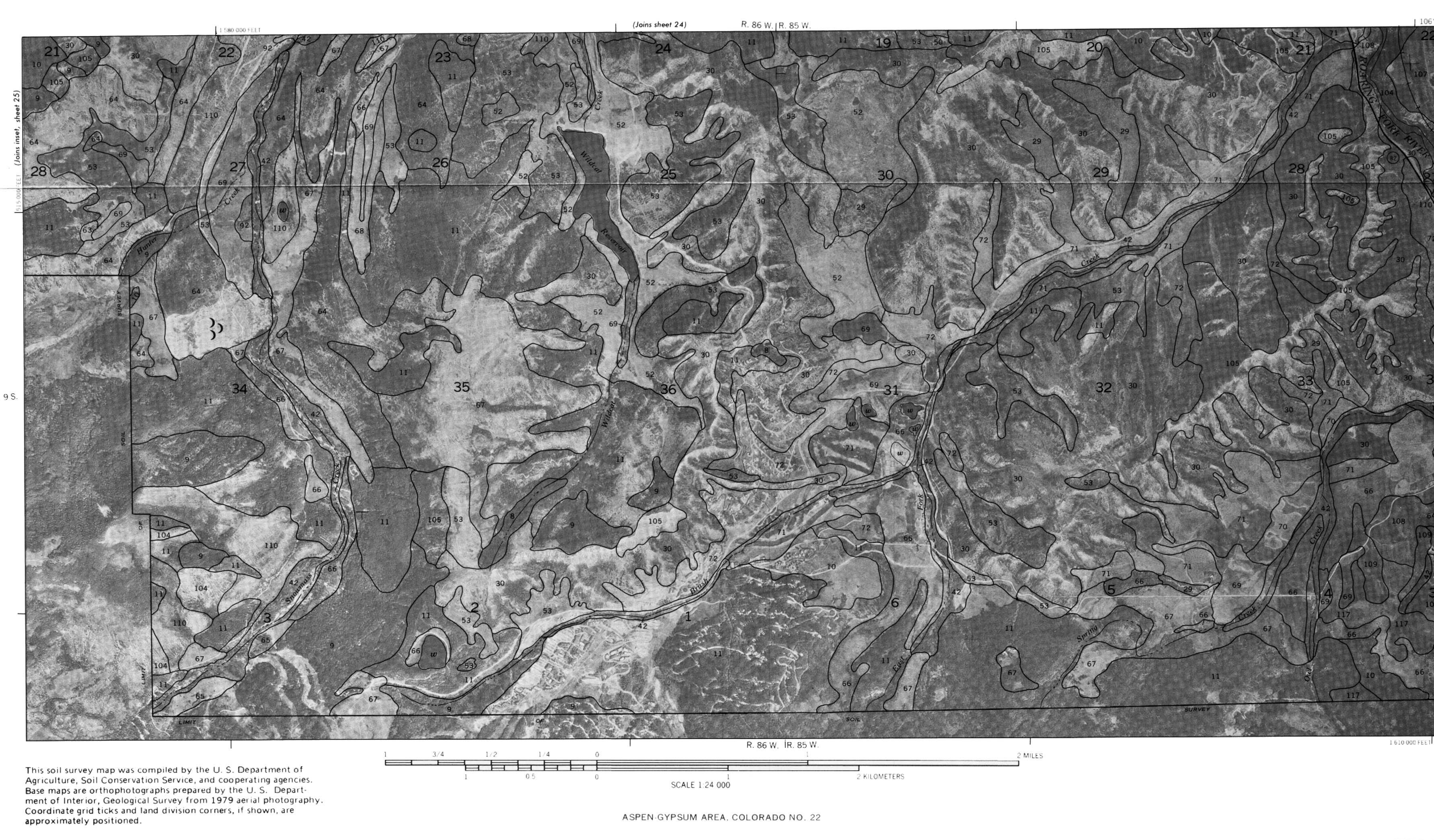
N

ASPEN-GYPSUM AREA, COLORADO NO. 21

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 22
SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(MOUNT SOPRIS QUADRANGLE)





1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

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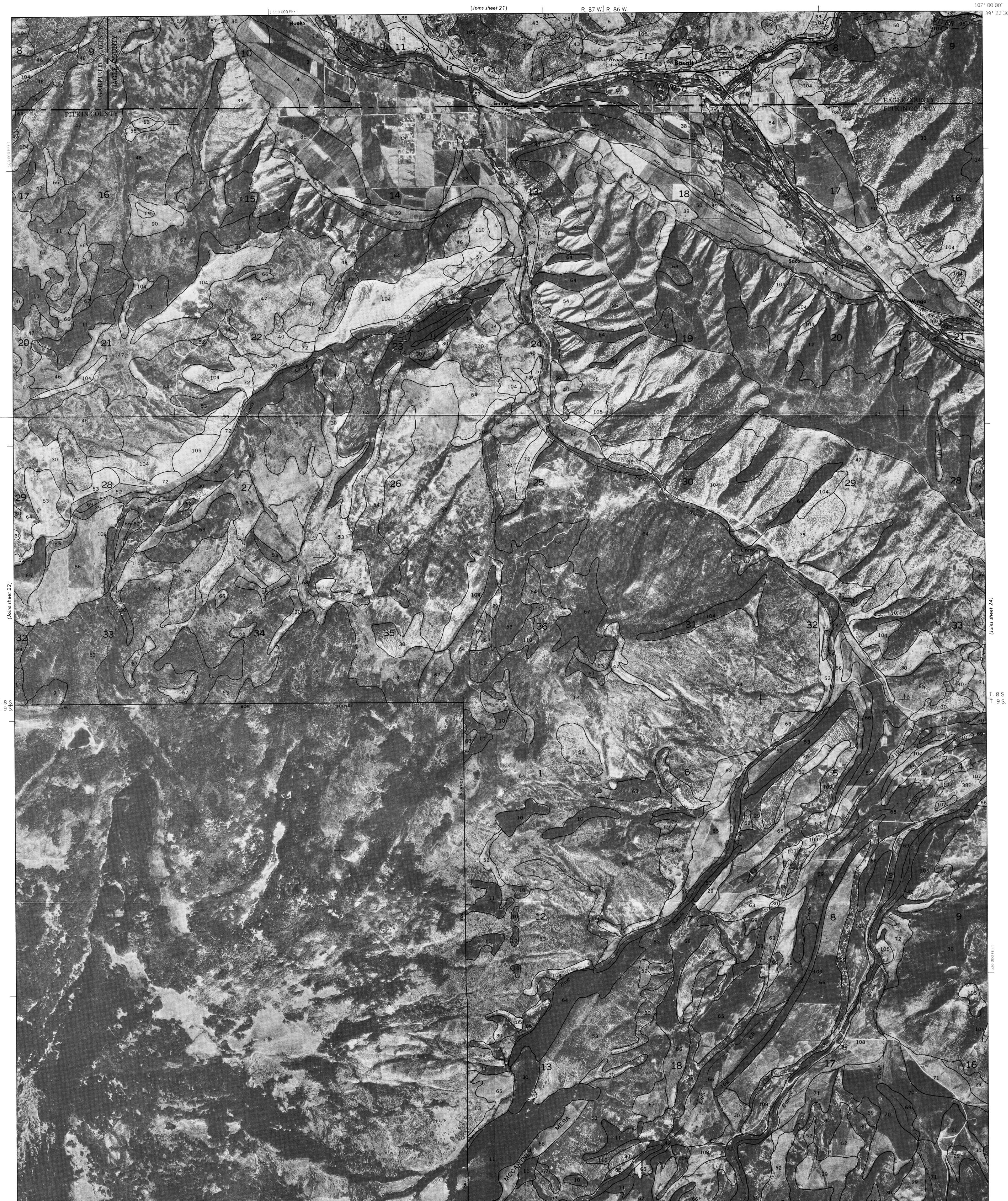
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

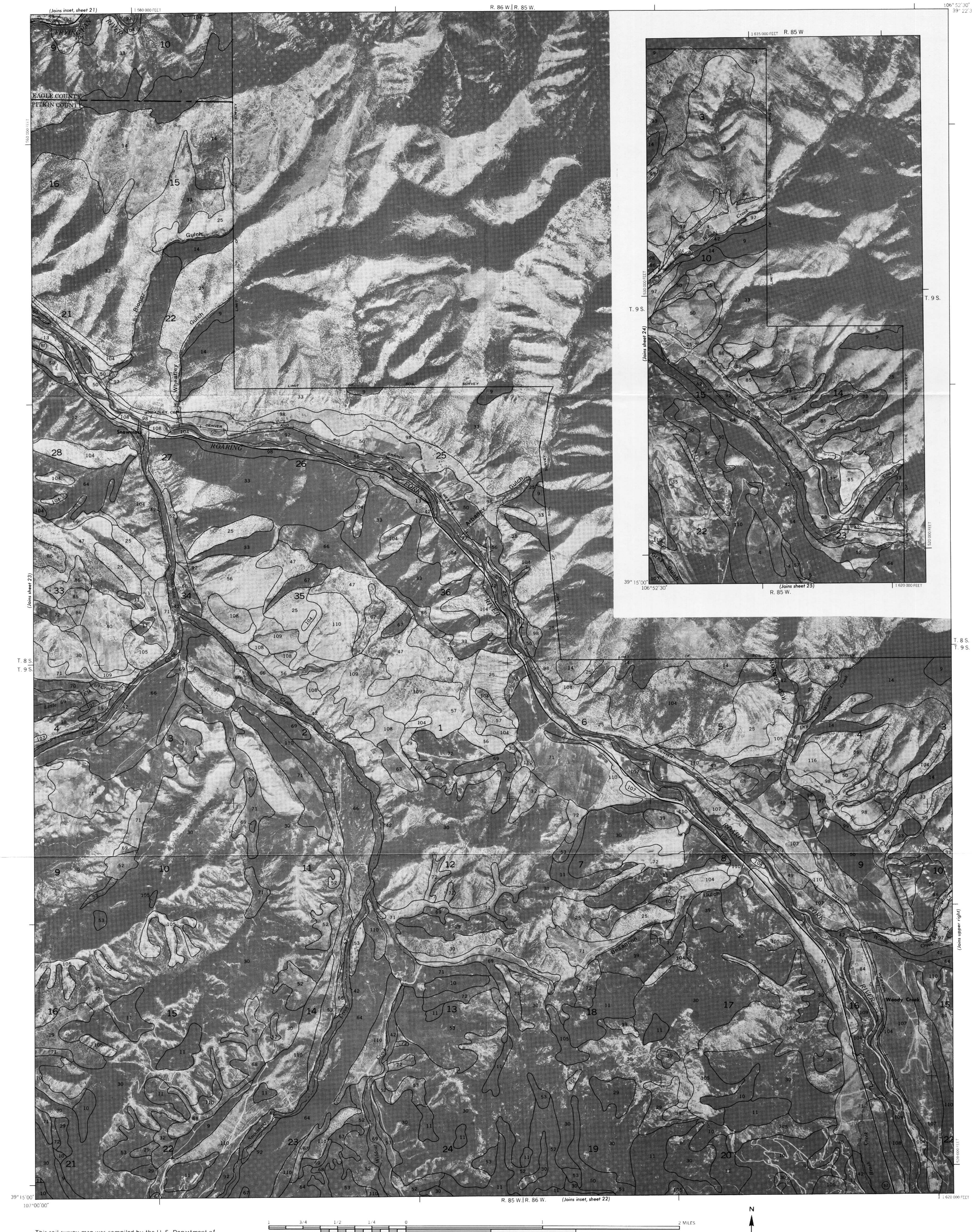
SHEET NO. 23
SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(BASALT QUADRANGLE)



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N



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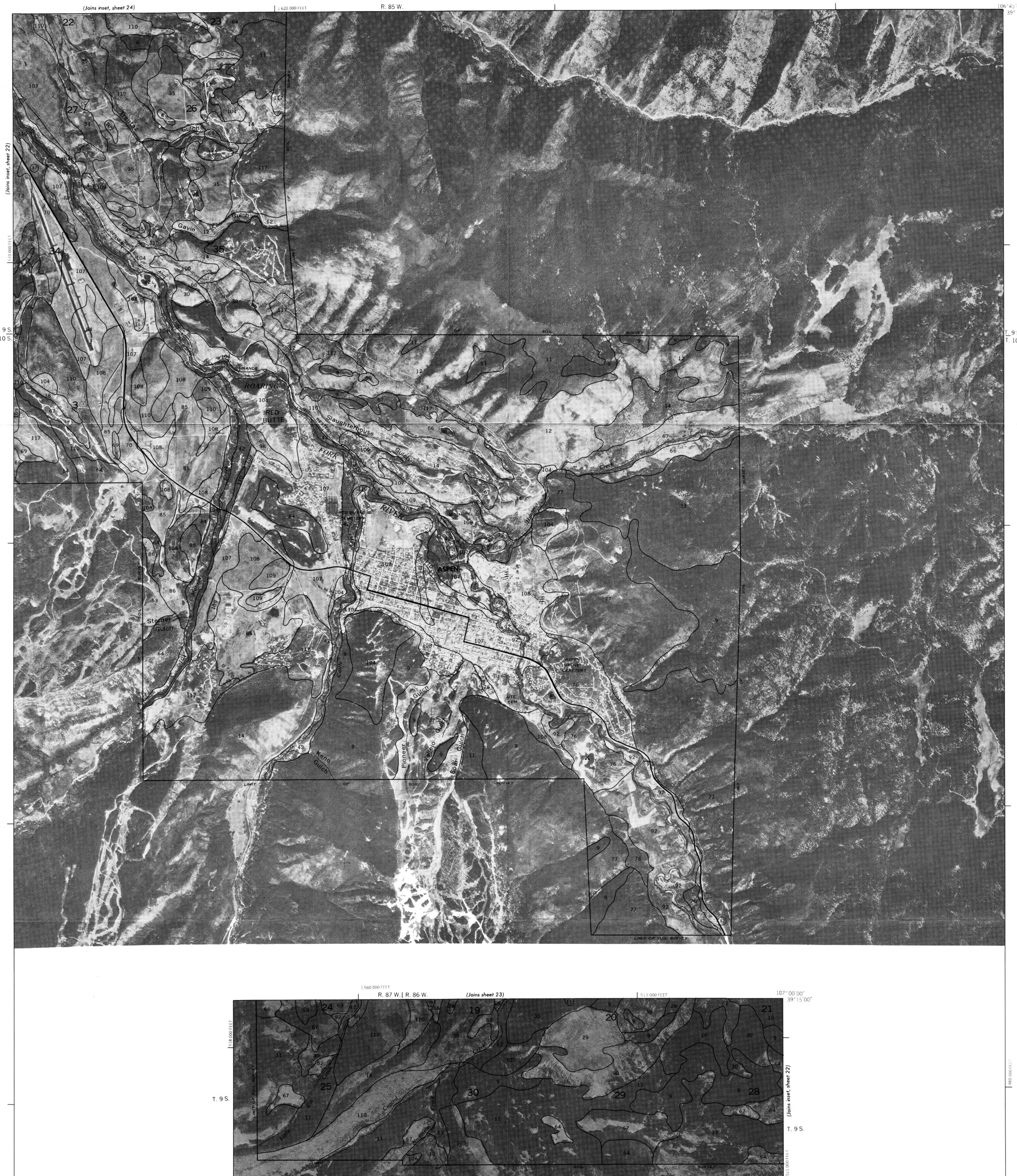
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 25
SOIL SURVEY OF ASPEN-GYPSUM AREA, COLORADO,
PARTS OF EAGLE, GARFIELD, AND PITKIN COUNTIES
(ASPEN QUADRANGLE)



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

ASPEN-GYPSUM AREA, COLORADO NO. 25